MDrive® Plus

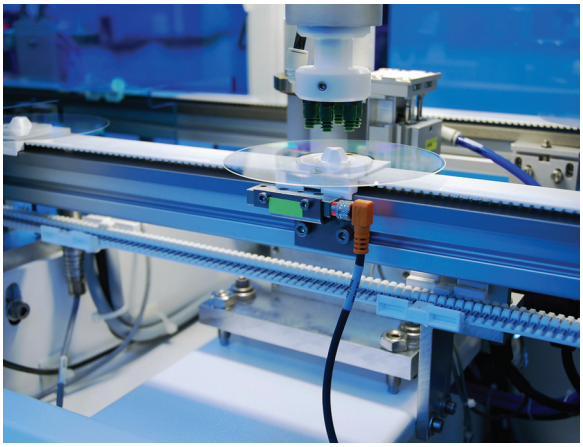
Integrated stepper motor control systems

5 DAYS QuickTurn orders

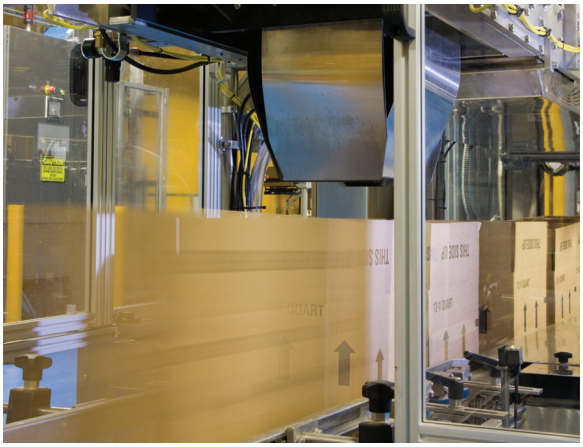
Schneider Electric

MDrive®Plus

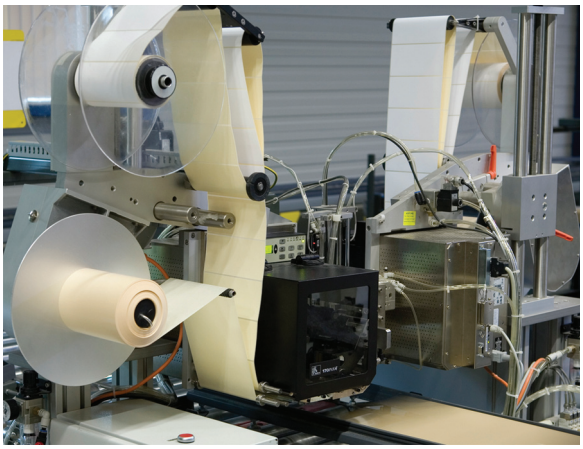
These compact, powerful and cost effective motion control solutions deliver unsurpassed smoothness and performance that will reduce system cost, design and assembly time for a large range of motion control applications.



Electronics manufacture



Packaging, printing, paper



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Medical technology

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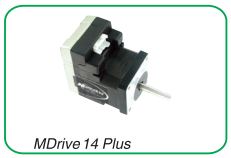
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Keywords

Compactness
Motor and electronics form a single, compact unit with small footprint that may dramatically reduce the space requirements in an application.

Simplicity
Integration of motor and electronics reduces installation costs and the potential for problems due to electrical noise by eliminating the cable between motor and drive. User-friendly PC commissioning software allows for rapid setup and configuration.

Ease of integration
Available in versions: Step/direction, Motion Control, Ethernet, CANopen and Speed Control. This open communication concept allows for integration in existing system environments.

Flexibility
Fit a wide range of applications with four flange sizes, DC and AC power supply, and communication protocols: RS-422/485, Ethernet, CANopen, SPI.

Integrated motion

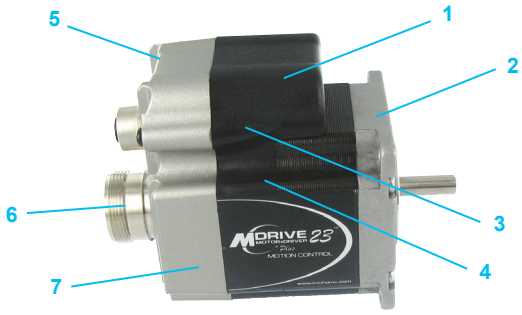
Save up to
50%
of space in the control cabinet

Reduce cabling by up to
40%

Cut installation time by up to
25%

With
100,000s
of MDrive products operating realiably all over the globe, we are the world market leader in the area of compact, low cost integrated motion

MDrive® Plus
Product overview



1	microstepping drive
2	stepper motor
3	controller
4	up to 8 I/O lines
5	internal encoder
6	industrial connectors
7	communication protocols: RS-422/485, CANopen, Ethernet, SPI

Product offer

MDrive® Plus integrated motion control products consist of a motor and electronics, ideal for machine builders who want an optimized motor with on-board electronics. The integrated electronics of MDrive Plus products reduce the potential for problems due to electrical noise by eliminating the cable between motor and drive.

MDrive Plus products use 1.8° 2-phase stepper motors integrated with a microstepping drive, and accept up to 20 resolution settings from full to 256 microsteps per full step, including: degrees, metric and arc minutes.

Compactness

Motor and electronics form a single, compact unit with small footprint. No space at all is required for the control electronics in the control cabinet and only very little space in the machine.

Simplicity

Integration of motor and electronics reduces installation costs and the potential for problems due to electrical noise by eliminating the cable between motor and drive. User-friendly PC commissioning software allows for rapid setup and configuration.

All-inclusive MDrive Plus QuickStart kits are available to simplify initial functional setup and system testing.

Ease of integration

MDrive Plus integrated motion control products are available in several versions:

- **Step / direction input**: motor and drive with optically isolated step and direction input via SPI communication

- **Motion Control**: motor, drive and fully programmable controller with up to 8 I/O lines, configurable 10-bit analog input, and RS-422/485 or Ethernet communication

- **Ethernet**: motor, drive and fully programmable controller with 4 I/O lines and ODVA-compliant EtherNet/IP protocol, also ModbusTCP

- **CANopen**: motor, drive and controller with CANopen interface support CiA DS301 and DSP402 Device Profile for Drives and Motion Control

- **Speed Control**: motor, drive and variable speed controller configurable electronically with resolutions switchable on-the-fly, SPI communication

This open communication concept allows for integration into existing system environments.

Flexibility

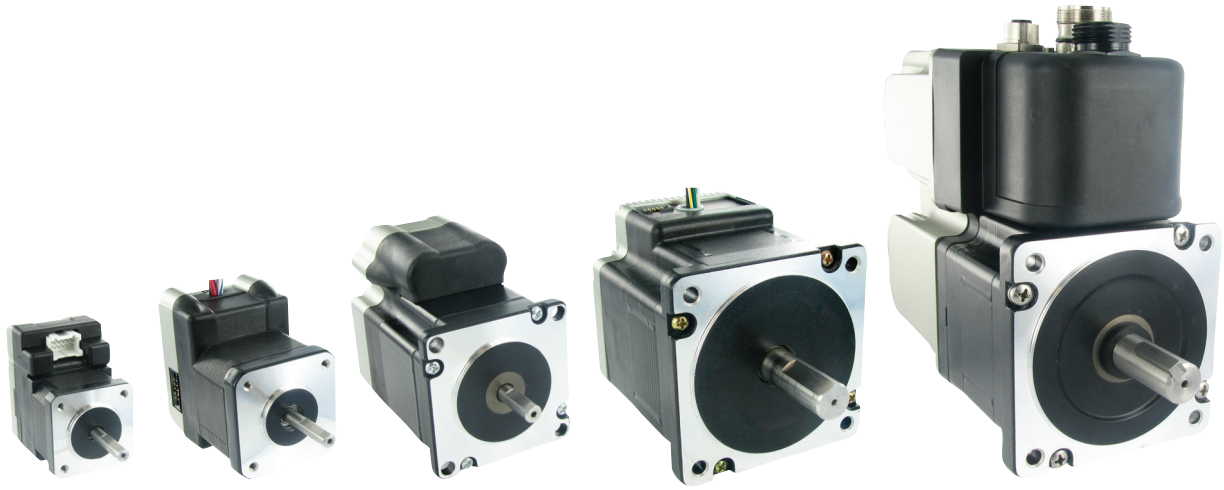
MDrive Plus integrated motion control products are available with 1.8° 2-phase stepper motors in four flange sizes: NEMA 14 (36mm), NEMA 17 (42mm), NEMA 23 (57mm) and NEMA 34 (86mm). Each motor size offers specific advantages so that the MDrive Plus products can be used in a wide range of different applications.

MDrive Plus products are available in two power versions: DC and AC. The DC version is available in all four motor sizes with a power range from +12 VDC up to +75 VDC. The AC version is available for NEMA 34 (86mm) motors and includes a 120 or 240 VAC built-in power supply.

MDrive® Plus
Product overview

Product groupings

size 14	size 17	size 23	size 34	size 34ac



Motor frame size	NEMA	14	17	23	34	34
	mm	35	42	57	85	85
Holding torque range	oz-in	18 ... 36	32 ... 75	90 ... 283	408 ... 1090	330 ... 750
	N-cm	13 ... 25	23 ... 53	64 ... 200	288 ... 770	233 ... 529

Step / direction input					
	MDM14	**MDM17**	**MDM23**	**MDM34**	**MDM34ac**
Communication for configuration	SPI				
Clock types	Step / Direction, Quadrature, Step Up / Step Down, Clockwise / Counterclockwise				
Step frequency	2 MHz default / 5 MHz maximum				

Motion Control					
	MDI14	**MDI17**	**MDI23**	**MDI34**	**MDI34ac**
Communication for configuration and programming	RS-422/485				
Operating modes	Fully programmable				

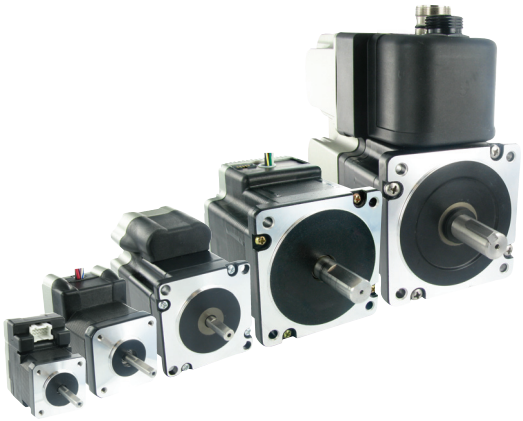
Ethernet					
	—	**—**	**MDI23 Ethernet**	**—**	**—**
Communication protocols	EtherNet/IP, ModbusTCP and MCode/TCP				
Device class	Device class				
Message types	Explicit or implicit				

CANopen					
	MDI14 CAN	**MDI17 CAN**	**MDI23 CAN**	**MDI34 CAN**	**MDI34ac CAN**
Communication for configuration and programming	CANopen				
Operating modes	Profile Position, Profile Velocity, Homing Mode				

Speed Control					
	—	**MDO17**	**MDO23**	**MDO34**	**—**
Communication for configuration	SPI				
Analog speed control input	10 bit resolution				
Selectable analog input signal modes	Voltage, Current, or PWM				

MDrive® Plus
Step / direction input

MDrive® Plus
Step / direction input



MDrive®Plus with step / direction input

Presentation

The MDrive® Plus with step / direction input is a 1.8° 2-phase stepper motor with on-board control electronics. Step/direction signals of a master controller, e.g. a motion controller, or A/B signals of an encoder, are converted directly into motion.

Settings for MDrive Plus step / direction input products may be changed on-the-fly or downloaded and stored in nonvolatile memory using the provided SPI Motor Interface software provided. This eliminates the need for external switches or resistors. Parameters are changed via an SPI port.

Application areas

The MDrive Plus with step / direction input is ideal for machine builders who want an optimized motor with on-board electronics. The integrated electronics of the MDrive Plus with step / direction input reduces the potential for problems due to electrical noise by eliminating the cable between motor and drive.

These compact, powerful and cost effective motion control solutions deliver unsurpassed smoothness and performance that will reduce system cost, design and assembly time for a large range of 2-phase stepper motor applications.

Features

- Highly integrated microstepping drive and high torque 1.8° 2-phase stepper motor
- Advanced current control for exceptional performance and smoothness
- Single supply: from +12 up to +75 VDC or 120 and 240 VAC
- Cost effective
- Extremely compact
- 20 microstep resolutions up to 51,200 steps per rev including: Degrees, Metric, Arc Minutes
- Optically isolated input options:
  – Universal +5 to +24 VDC signals, sourcing or sinking
  – Differential +5 VDC signals *(1)*
- Automatic current reduction
- Configurable:
  – Motor run / hold current
  – Motor direction via direction input
  – Microstep resolution
  – Clock type: step and direction, quadrature, step up and step down, clockwise and counterclockwise *(1)*
  – Programmable digital filtering for clock and direction inputs
- Available options:
  – Long life linear actuators *(2)*
  – Hybrid Motion Technology™ *(2)*
  – Encoders
  – Control knob for manual positioning
  – Industrial connectors with IP54 rating *(3)*
- Several motor stack lengths available
- Setup parameters may be switched on-the-fly
- Numerous connector interface choices
- Graphical user interface provided for quick and easy parameter setup

(1) CW / CCW input unavailable for MDrive34 or MDrive34ac products.
(2) See separate documentation.
(3) Industrial connectors are unavailable for MDrive14 or MDrive34 products.

Plus specifications

			MDrive 14	MDrive 17	MDrive 23 *(1)*	MDrive 23 *(1)*	MDrive 34	MDrive 34 ac	
Input power	Voltage	VDC	12 to 48	12 to 48	12 to 75	12 to 60	12 to 75	—	—
		VAC	—	—	—	—	—	120	240
	Current maximum *(2)*		1A	2A	2A	3.5A	4A	95 to 132 VAC @ 50/60 Hz	95 to 264 VAC @ 50/60 Hz
Thermal	Operating temp non-condensing	Heat sink	–40° to +85°C				–40° to +75°C		
		Motor	–40° to +100°C				–40° to +90°C		
Protection	Type		not applicable					- Thermal - Over voltage / current	
Isolated input	Universal		Voltage range: +5 to +24 VDC sourcing or sinking step clock, direction and enable						
	Differential		Voltage range: +5 VDC clockwise and counterclockwise				not applicable		
Motion	Digital filter range		50 nS to 12.9 µS (10 MHz to 38.8 kHz)						
	Clock types		Step / direction, quadrature, step up / step down, clockwise / counterclockwise				Step / direction, quadrature, step up / step down		
	Step frequency		2 MHz default / 5 MHz maximum					2 MHz default	
	Resolution	Number of settings	20						
		Steps per revolution	200, 400, 800, 1000, 1600, 2000, 3200, 5000, 6400, 10000, 12800, 20000, 25000, 25600, 40000, 50000, 51200, 36000 (0.01 deg/µstep), 21600 (1 arc minute/µstep), 25400 (0.001 mm/µstep)						

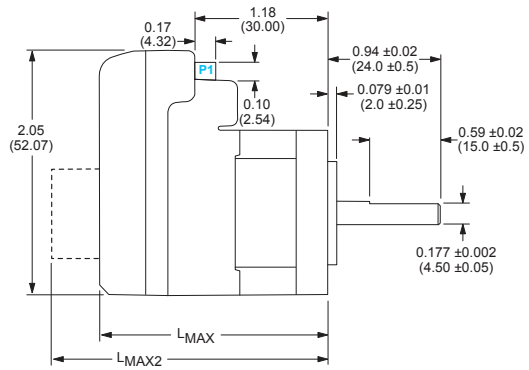
Setup parameters *(3)*

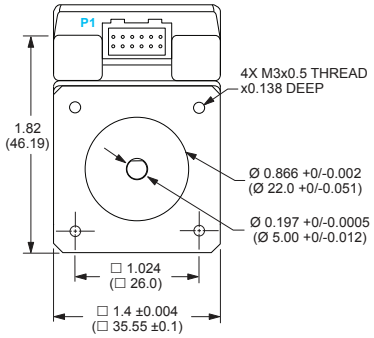
		Function	Range	Units	Default
SPI communication					
	MHC	Motor hold current	0 to 100	percent	5
	MRC	Motor run current	1 to 100	percent	25
	MSEL	Microstep resolution	1, 2, 4, 5, 8, 10, 16, 25, 32, 50, 64, 100, 108, 125, 127, 128, 180, 200, 250, 256	µsteps per full step	256
	DIR	Motor direction override	0 / 1	—	CW
	HCDT	Hold current delay time	0 or 2 – 65535	mSec	500
	CLK TYPE	Clock type	Step / Dir, Quadrature, Up / Down, CW / CCW	—	Step / Dir
	CLK IOF	Clock and direction filter	50 nS to 12.9 µS (10 MHz to 38.8 kHz)	nS (MHz)	200 nS (2 MHz)
	USER ID	User ID	Customizable	1–3 characters	IMS
	EN ACT	Enable active	High / Low	—	High
	WARN TEMP *(4)*	Over temperature warning	0 to 125°C	°C	80°C

(1) Only quad stack NEMA 23 motors have +12 to +60 VDC drives, all other NEMA 23 motors have +12 to +75 VDC drives.
(2) Actual power supply current will depend on voltage and load.
(3) All parameters are set using the supplied SPI Motor Interface GUI and may be changed on-the-fly. An optional Communication Converter is recommended with first orders.
(4) Only with MDrive34 and MDrive34ac products.

See User Manual for complete details: www.motion.schneider-electric.com/manuals.html

– Plus – mechanical specifications, dimensions in inches (mm)

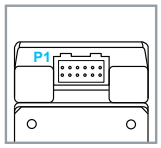




Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	1.93 (49.02)	2.62 (66.55)
Triple	3.03 (76.96)	3.73 (94.74)

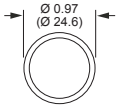
(1) Single shaft.
(2) Control knob or external encoder.

P1 connector
I/O, Power & Communication

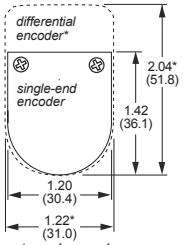


12-pin locking wire crimp connector

Lmax2 options

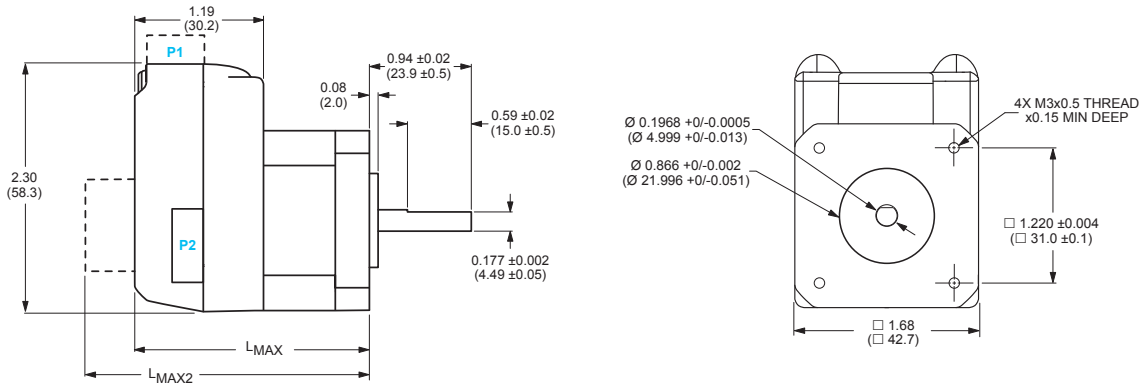


control knob



external encoder

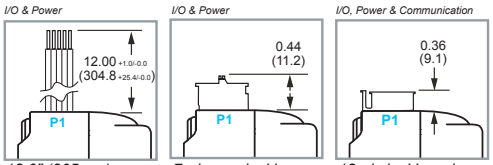
– Plus – mechanical specifications, dimensions in inches (mm)



Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	2.20 (55.9)	2.79 (70.9)
Double	2.43 (61.7)	3.02 (76.7)
Triple	2.77 (70.4)	3.37 (85.6)

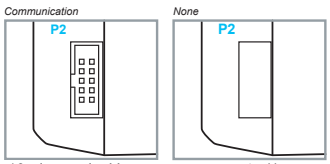
(1) Single shaft.
(2) Control knob or external encoder.

P1 connector options



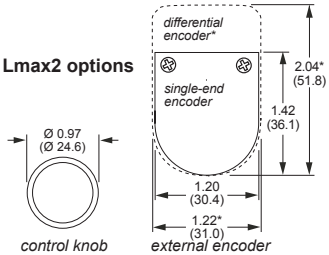
12.0" (305mm) flying leads
7-pin non-locking spring clamp terminal strip
*12-pin locking wire crimp connector***

P2 connector options



10-pin non-locking IDC connector
*no connector***

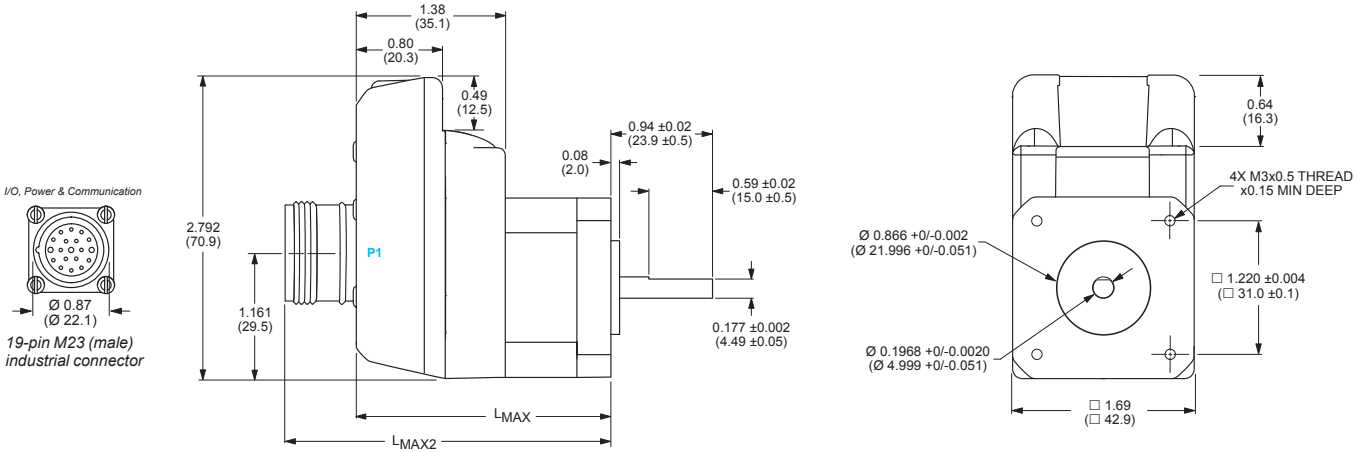
Lmax2 options



control knob
external encoder

***12-pin locking wire crimp connector at P1 eliminates the P2 connector*

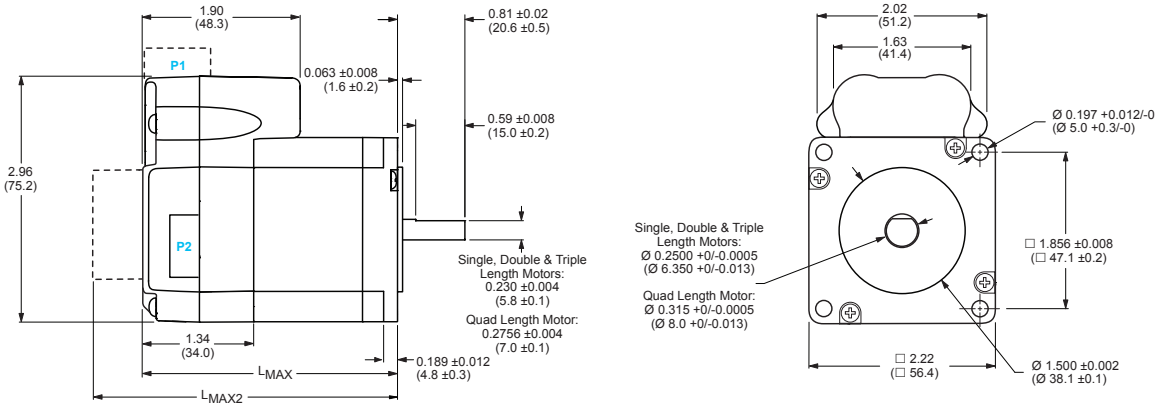
– Plus with industrial connector – mechanical specifications, dimensions in inches (mm)



19-pin M23 (male) industrial connector

Motor stack length	Lmax	Lmax2
Single	2.39 (60.71)	3.06 (77.72)
Double	2.62 (66.55)	3.29 (83.57)
Triple	2.96 (75.18)	3.63 (92.20)

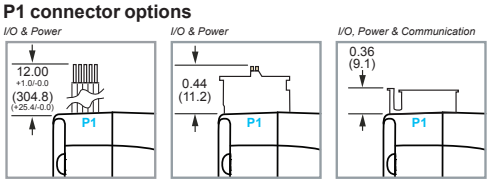
– Plus – mechanical specifications, dimensions in inches (mm)



Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	2.65 (67.31)	3.36 (85.34)
Double	3.02 (76.71)	3.73 (94.74)
Triple	3.88 (98.55)	4.59 (116.59)
Quad	5.28 (134.15)	5.99 (152.19)

(1) Single shaft.
(2) Control knob or external encoder.

P1 connector options

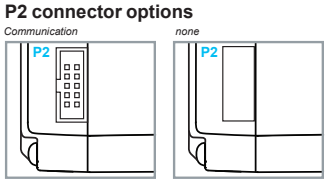


12.0" (305mm) flying leads

7-pin non-locking spring clamp terminal strip

*12-pin locking wire crimp connector***

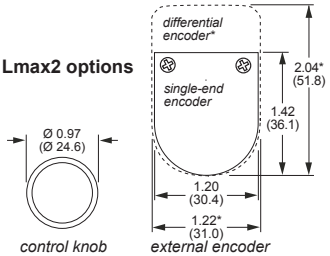
P2 connector options



10-pin non-locking IDC connector

*no connector***

Lmax2 options

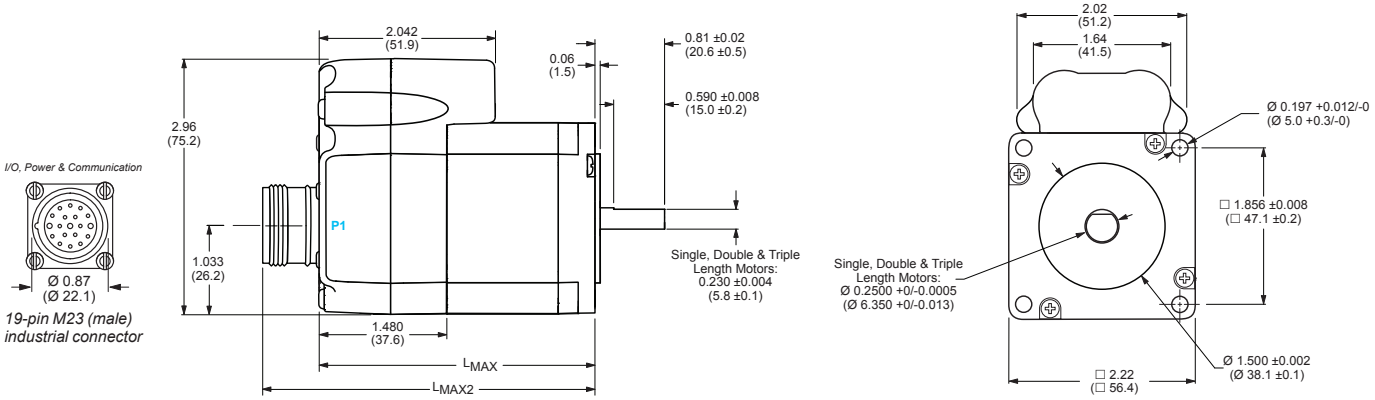


control knob

external encoder

***12-pin locking wire crimp connector at P1 eliminates the P2 connector*

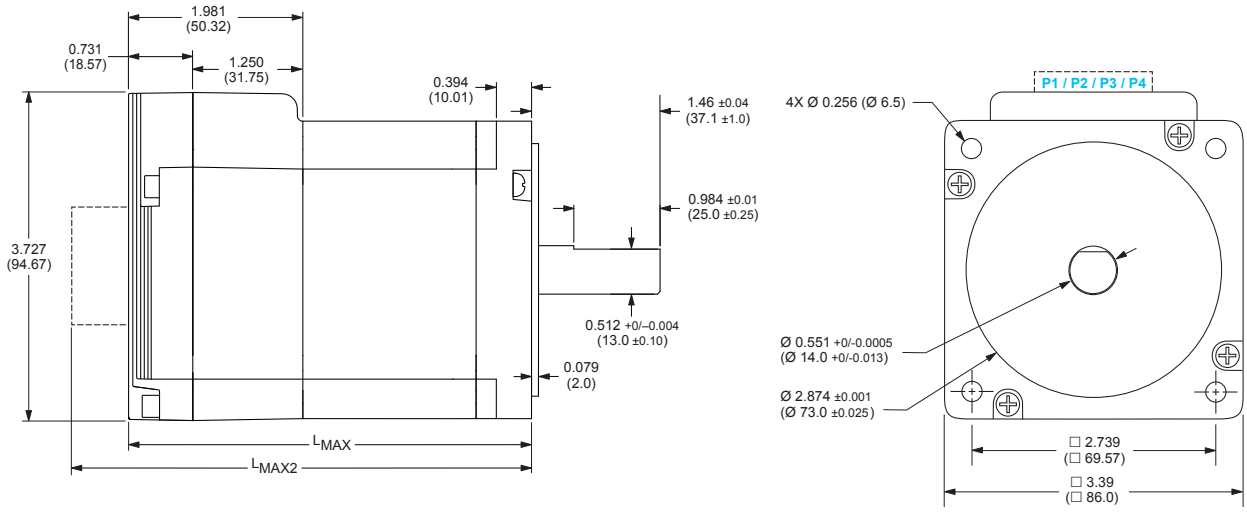
– Plus with industrial connector – mechanical specifications, dimensions in inches (mm)



19-pin M23 (male) industrial connector

Motor stack length	Lmax	Lmax2
Single	2.82 (71.63)	3.48 (88.39)
Double	3.16 (80.26)	3.82 (97.03)
Triple	4.02 (102.11)	4.67 (118.62)

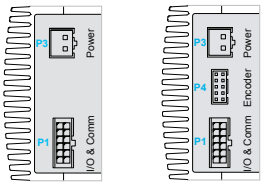
– Plus – mechanical specifications, dimensions in inches (mm)



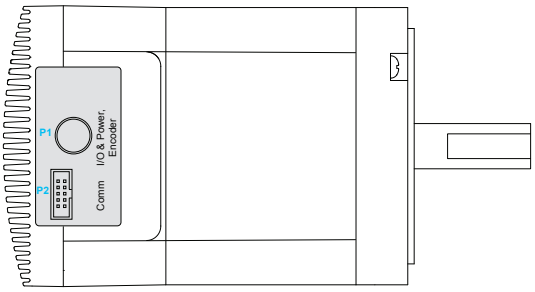
Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	3.81 (96.77)	4.52 (114.81)
Double	4.60 (116.84)	5.31 (134.87)
Triple	6.17 (156.72)	6.88 (174.75)

(1) Single shaft or internal encoder.
(2) Control knob.

Connector options

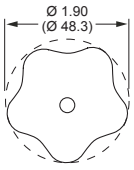


Pluggable interface version:
12-pin and 2-pin locking wire crimp connectors only, or with 10-pin friction lock wire crimp connector when optional internal encoder is included



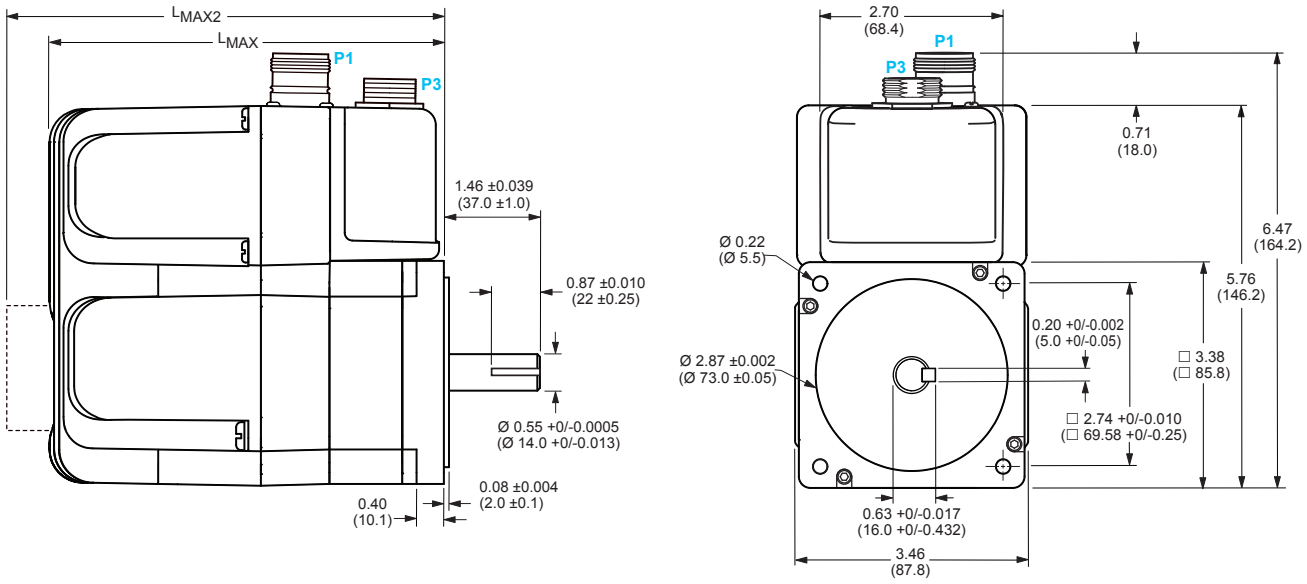
Flying leads interface version:
12" (305mm) flying leads with 10-pin non-locking IDC connector

Lmax2 option



control knob

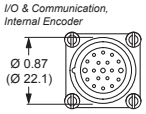
– Plus with industrial connectors – mechanical specifications, dimensions in inches (mm)



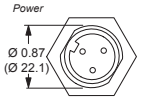
Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	6.1 (155.0)	7.1 (180.4)
Double	6.9 (174.3)	7.9 (199.7)
Triple	8.4 (214.3)	9.4 (239.7)

(1) Single shaft or internal encoder.
(2) Control knob.

Connector options

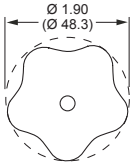


P1: 19-pin M23 (male) industrial connector



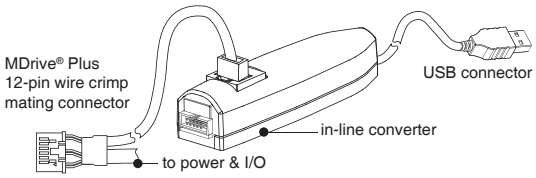
P3: 3-pin Euro AC (male) industrial connector

Lmax2 option

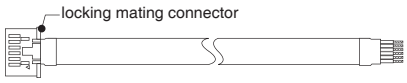


control knob

MDrive® 14 Plus
Step / direction input



MD-CC305-001



PD12B-1434-FL3

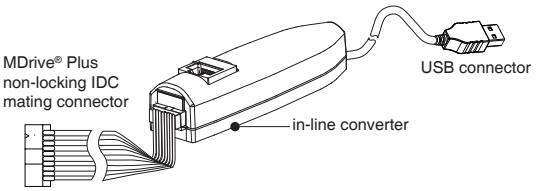
Installation accessories

Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For all MDrive14 step / direction input products	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 12-pin locking wire crimp connector	12.0 (3.6)	**MD-CC305-001**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 12-pin locking wire crimp connector for I/O, communication and power	10.0 (3.0)	**PD12B-1434-FL3**
Encoder cables		
Pre-wired mating connector with other cable end open.		
■ For external single-end optical encoder	1.0 (0.3)	**ES-CABLE-2**
■ For external differential optical encoder with locking connector	6.0 (1.8)	**ED-CABLE-6**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 12-pin locking wire crimp connector for I/O, communication and power	—	**CK-08**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive14 step / direction input products	—	**DPM75**

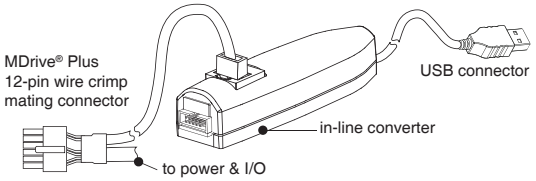
(1) See page 18.

Connectivity details: www.motion.schneider-electric.com/connect.html

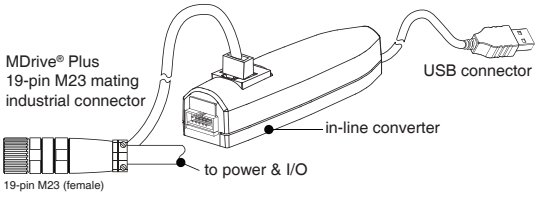
MDrive® 17 Plus
Step / direction input



MD-CC300-001

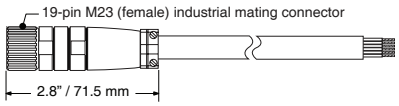


MD-CC303-001



MD-CC301-001

PD12-1434-FL3



MD-CS100-000

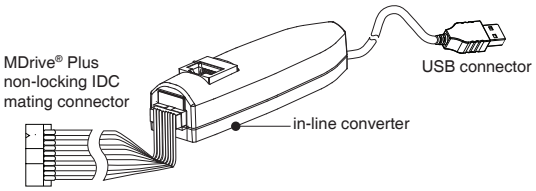
Installation accessories

Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For all MDrive17 step / direction input products	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 10-pin non-locking IDC connector	12.0 (3.6)	**MD-CC300-001**
■ Mates to 12-pin locking wire crimp connector	12.0 (3.6)	**MD-CC303-001**
■ Mates to 19-pin male M23 industrial connector	12.0 (3.6)	**MD-CC301-001**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 12-pin locking wire crimp connector for I/O, communication and power	10.0 (3.0)	**PD12-1434-FL3**
■ Mates to 19-pin male M23 industrial connector with straight termination for I/O, communication and power	13.0 (4.0)	**MD-CS100-000**
■ Mates to 19-pin male M23 industrial connector with right angle termination for I/O, communication and power	13.0 (4.0)	**MD-CS101-000**
Encoder cables		
Pre-wired mating connector with other cable end open.		
■ For external single-end optical encoder with non-locking connector	1.0 (0.3)	**ES-CABLE-2**
■ For external differential optical encoder with locking connector	6.0 (1.8)	**ED-CABLE-6**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 10-pin non-locking IDC connector for communication	—	**CK-01**
■ 12-pin locking wire crimp connector for I/O, communication and power	—	**CK-03**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive17 step / direction input products	—	**DPM75**

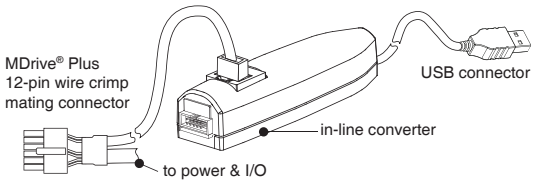
(1) See page 19.

Connectivity details: www.motion.schneider-electric.com/connect.html

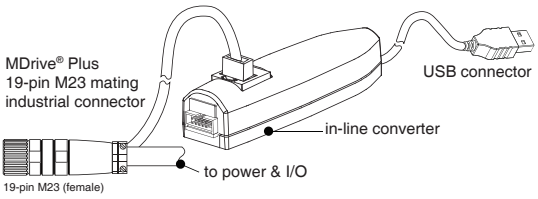
MDrive® 23 Plus
Step / direction input



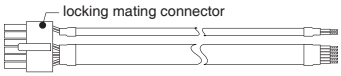
MD-CC300-001



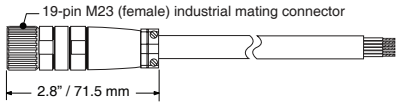
MD-CC303-001



MD-CC301-001



PD12-1434-FL3



MD-CS100-000

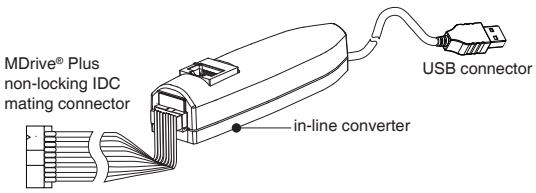
Installation accessories

Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For all MDrive23 step / direction input products	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 10-pin non-locking IDC connector	12.0 (3.6)	**MD-CC300-001**
■ Mates to 12-pin locking wire crimp connector	12.0 (3.6)	**MD-CC303-001**
■ Mates to 19-pin male M23 industrial connector	12.0 (3.6)	**MD-CC301-001**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 12-pin locking wire crimp connector for I/O, communication and power	10.0 (3.0)	**PD12-1434-FL3**
■ Mates to 19-pin male M23 industrial connector with straight termination for I/O, communication and power	13.0 (4.0)	**MD-CS100-000**
■ Mates to 19-pin male M23 industrial connector with right angle termination for I/O, communication and power	13.0 (4.0)	**MD-CS101-000**
Encoder cables		
Pre-wired mating connector with other cable end open.		
■ For external single-end optical encoder with non-locking connector	1.0 (0.3)	**ES-CABLE-2**
■ For external differential optical encoder with locking connector	6.0 (1.8)	**ED-CABLE-6**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 10-pin non-locking IDC connector for communication	—	**CK-01**
■ 12-pin locking wire crimp connector for I/O, communication and power	—	**CK-03**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive23 step / direction input products	—	**DPM75**

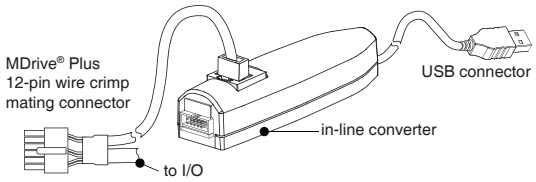
(1) See page 20.

Connectivity details: www.motion.schneider-electric.com/connect.html

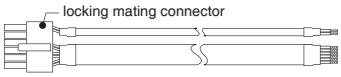
MDrive® 34 Plus
Step / direction input



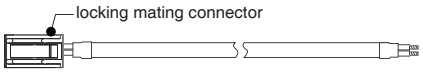
MD-CC300-001



MD-CC303-001



PD12-1434-FL3



PD02-3400-FL3

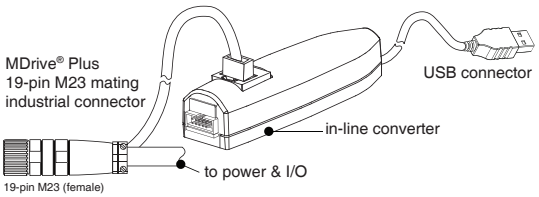
Installation accessories

Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For all MDrive34 step / direction input products	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 10-pin non-locking IDC connector	12.0 (3.6)	**MD-CC300-001**
■ Mates to 12-pin locking wire crimp connector	12.0 (3.6)	**MD-CC303-001**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 12-pin locking wire crimp connector for I/O and communication	10.0 (3.0)	**PD12-1434-FL3**
■ Mates to 2-pin locking wire crimp connector for power	10.0 (3.0)	**PD02-3400-FL3**
Encoder cables		
Pre-wired mating connector with other cable end open.		
■ 10-pin friction lock wire crimp connector for optional internal differential optical encoder	6.0 (1.8)	**PD10-3400-FL3**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 12-pin locking wire crimp connector for I/O and communication	—	**CK-03**
■ 2-pin locking wire crimp connector for power	—	**CK-05**
■ 10-pin friction lock wire crimp connector for optional internal differential optical encoder	—	**CK-02**
■ 10-pin non-locking IDC connector for I/O and communication	—	**CK-01**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive34 step / direction input products	—	**DPM75**

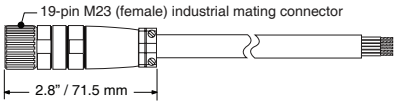
(1) See page 21.

Connectivity details: www.motion.schneider-electric.com/connect.html

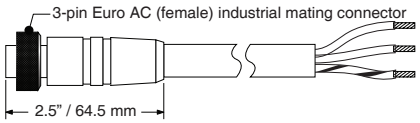
MDrive® 34 ac Plus
Step / direction input



MD-CC301-001



MD-CS100-000



MD-CS200-000

Installation accessories

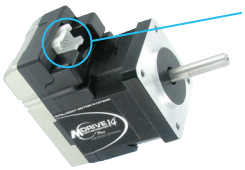
Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For all MDrive34ac step / direction input products	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 19-pin male M23 industrial connector, with interface for optional internal differential optical encoder	12.0 (3.6)	**MD-CC301-001**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 19-pin male M23 industrial connector with straight termination for I/O, communication and optional encoder	13.0 (4.0)	**MD-CS100-000**
■ Mates to 19-pin male M23 industrial connector with right angle termination for I/O, communication and optional encoder	13.0 (4.0)	**MD-CS101-000**
■ Mates to 3-pin male Euro AC industrial connector with straight termination for power	13.0 (4.0)	**MD-CS200-000**
■ Mates to 3-pin male Euro AC industrial connector with right angle termination for power	13.0 (4.0)	**MD-CS201-000**

(1) See page 22.

Connectivity details: www.motion.schneider-electric.com/connect.html

MDrive® 14 Plus
Step / direction input

MDrive® 14 Plus



P1: I/O, Power & Communication
C = 12-pin locking wire crimp connector

Part numbers

Example:	K	M	D	M	1	C	S	Z	1	4	A	4	–E1
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	M	1	C	S	Z	1	4	A	4	–E1
MDrive Plus version **MDM** = Step / direction input	K	**M**	**D**	**M**	1	C	S	Z	1	4	A	4	–E1
Input **1** = Universal input **5** = Differential CW/CCW input	K	M	D	M	**1**	C	S	Z	1	4	A	4	–E1
P1 connector **C** = wire crimp	K	M	D	M	1	**C**	S	Z	1	4	A	4	–E1
Communication **S** = SPI	K	M	D	M	1	C	**S**	Z	1	4	A	4	–E1
P2 connector **Z** = none	K	M	D	M	1	C	S	**Z**	1	4	A	4	–E1
Motor size **14** = NEMA 14 (1.4" / 36 mm)	K	M	D	M	1	C	S	Z	**1**	**4**	A	4	–E1
Motor length **A** = single stack **C** = triple stack	K	M	D	M	1	C	S	Z	1	4	**A**	4	–E1
Drive voltage **4** = +12 to +48 VDC	K	M	D	M	1	C	S	Z	1	4	A	**4**	–E1
Options Leave blank if not wanted Options may not be combined													**–E1**

–E___ = external optical encoder with index mark

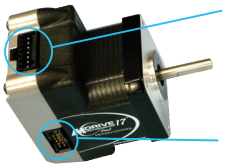
line count	100	200	250	256	400	500	512	1000	1024
single-end part #	E1	E2	E3	EP	E4	E5	EQ	E6	ER
differential part #	EAL	EBL	ECL	EWL	EDL	EHL	EXL	EJL	EYL

–N = rear control knob for manual positioning

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 17 Plus
Step / direction input

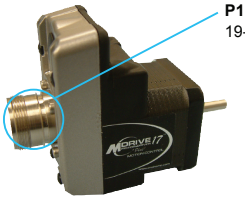
MDrive® 17 Plus



P1: I/O & Power
F = 12" flying leads
P = non-locking spring clamp terminal strip
C = 12-pin locking wire crimp (includes I/O, Power & Comm)

P2: Communication
D = SPI with 10-pin IDC non-locking connector
Z = None. Used with 12-pin locking wire crimp in position P1, which includes communication.

MDrive® 17 Plus
with industrial connector



P1: I/O, Power & Communication
19-pin M23 male industrial connector

Part numbers

Example:	K	M	D	M	1	F	S	D	1	7	A	4	–E1
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	M	1	F	S	D	1	7	A	4	–E1
MDrive Plus version **MDM** = Step / direction input	K	**M**	**D**	**M**	1	F	S	D	1	7	A	4	–E1
Input **1** = Universal input **2** = Universal input with industrial connector, IP54-rated **5** = Differential CW/CCW input *(1)*	K	M	D	M	**1**	F	S	D	1	7	A	4	–E1
P1 connector **F** = flying leads **P** = pluggable **C** = wire crimp **M** = industrial connector *(2)*	K	M	D	M	1	**F**	S	D	1	7	A	4	–E1
Communication **S** = SPI	K	M	D	M	1	F	**S**	D	1	7	A	4	–E1
P2 connector *(3) (4)* **D** = IDC **Z** = none	K	M	D	M	1	F	S	**D**	1	7	A	4	–E1
Motor size **17** = NEMA 17 (1.7" / 42 mm)	K	M	D	M	1	F	S	D	**1**	**7**	A	4	–E1
Motor length **A** = single stack **B** = double stack **C** = triple stack	K	M	D	M	1	F	S	D	1	7	**A**	4	–E1
Drive voltage **4** = +12 to +48 VDC	K	M	D	M	1	F	S	D	1	7	A	**4**	–E1
Options Leave blank if not wanted Options may not be combined													**–E1**

–E___ = external optical encoder with index mark *(1)*

line count	100	200	250	256	400	500	512	1000	1024
single-end part #	E1	E2	E3	EP	E4	E5	EQ	E6	ER
differential part #	EAL	EBL	ECL	EWL	EDL	EHL	EXL	EJL	EYL

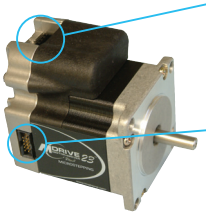
–N = rear control knob for manual positioning *(1)*

(1) Not available with industrial connector products.
(2) Only available with industrial connector products.
(3) Wire crimp connector at P1 includes communication, so the P2 designator is Z=none.
(4) Industrial connector at P1 includes communication, so the P2 designator is Z=none.

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 23 Plus
Step / direction input

MDrive® 23 Plus



P1: I/O & Power
F = 12" flying leads
P = non-locking spring clamp terminal strip
C = 12-pin locking wire crimp (includes I/O, Power & Comm)

P2: Communication
D = SPI with 10-pin IDC non-locking connector
Z = None. Used with 12-pin locking wire crimp in position P1, which includes communication.

MDrive® 23 Plus
with industrial connector

P1: I/O, Power & Communication
19-pin M23 male industrial connector

Part numbers

Example:	K	M	D	M	1	F	S	D	2	3	A	7	–E1
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	M	1	F	S	D	2	3	A	7	–E1
MDrive Plus version **MDM** = Step / direction input	K	**M**	**D**	**M**	1	F	S	D	2	3	A	7	–E1
Input **1** = Universal input **2** = Universal input with industrial connector, IP54-rated **5** = Differential CW/CCW input *(1)*	K	M	D	M	**1**	F	S	D	2	3	A	7	–E1
P1 connector **F** = flying leads **P** = pluggable **C** = wire crimp **M** = industrial connector *(2)*	K	M	D	M	1	**F**	S	D	2	3	A	7	–E1
Communication **S** = SPI	K	M	D	M	1	F	**S**	D	2	3	A	7	–E1
P2 connector *(3) (4)* **D** = IDC **Z** = none	K	M	D	M	1	F	S	**D**	2	3	A	7	–E1
Motor size **23** = NEMA 23 (2.3" / 57 mm)	K	M	D	M	1	F	S	D	**2**	**3**	A	7	–E1
Motor length *(5)* **A** = single stack **B** = double stack **C** = triple stack **D** = quad stack *(1)*	K	M	D	M	1	F	S	D	2	3	**A**	7	–E1
Drive voltage *(5)* **7** = +12 to +75 VDC **6** = +12 to +60 VDC	K	M	D	M	1	F	S	D	2	3	A	**7**	–E1
Options Leave blank if not wanted Options may not be combined													**–E1**

–E___ = external optical encoder with index mark *(1)*

line count	100	200	250	256	400	500	512	1000	1024
single-end part #	E1	E2	E3	EP	E4	E5	EQ	E6	ER
differential part #	EAL	EBL	ECL	EWL	EDL	EHL	EXL	EJL	EYL

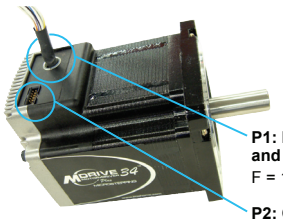
–N = rear control knob for manual positioning *(1)*

(1) Not available with industrial connector products.
(2) Only available with industrial connector products.
(3) Wire crimp connector at P1 includes communication, so the P2 designator is Z=none.
(4) Industrial connector at P1 includes communication, so the P2 designator is Z=none.
(5) Only quad stack motors have +12 to +60 VDC drives, all other motors have +12 to +75 VDC drives.

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 34 Plus
Step / direction input

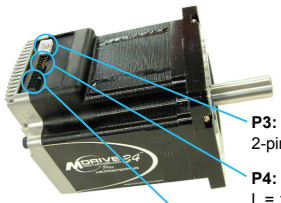
MDrive® 34 Plus
flying leads interface



P1: I/O & Power, and optional encoder
F = 12" flying leads

P2: Communication
D = SPI with 10-pin IDC non-locking connector

MDrive® 34 Plus
pluggable interface



P3: Power
2-pin locking wire crimp

P4: Optional Encoder
L = 10-pin friction lock wire crimp connector
Z = None. No encoder.

P1: I/O & Communication
C = SPI with 12-pin locking wire crimp connector

Part numbers

Example:	K	M	D	M	1	F	S	D	3	4	A	7	–E1
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	M	1	F	S	D	3	4	A	7	–E1
MDrive Plus version **MDM** = Step / direction input	K	**M**	**D**	**M**	1	F	S	D	3	4	A	7	–E1
Input **1** = Universal input	K	M	D	M	**1**	F	S	D	3	4	A	7	–E1
P1 connector **F** = flying leads **C** = pluggable	K	M	D	M	1	**F**	S	D	3	4	A	7	–E1
Communication **S** = SPI	K	M	D	M	1	F	**S**	D	3	4	A	7	–E1
P2 connector **D** = only with P1 connector F **P4 connector** **L** = only with encoder and P1 connector C **Z** = only without encoder and P1 connector C	K	M	D	M	1	F	S	**D**	3	4	A	7	–E1
Motor size **34** = NEMA 34 (3.4" / 86 mm)	K	M	D	M	1	F	S	D	**3**	**4**	A	7	–E1
Motor length **A** = single stack **B** = double stack **C** = triple stack	K	M	D	M	1	F	S	D	3	4	**A**	7	–E1
Drive voltage **7** = +12 to +75 VDC	K	M	D	M	1	F	S	D	3	4	A	**7**	–E1
Options Leave blank if not wanted Options may be combined													**–E1**

–E___ = internal optical encoder with index mark *(1)*

line count	100	200	250	256	400	500	512	1000	1024
single-end part #	E1	E2	E3	EP	E4	E5	EQ	E6	ER
differential part #	EA	EB	EC	EW	ED	EH	EX	EJ	EY

–N = rear control knob for manual positioning

(1) Products with pluggable interface available only with differential encoder.

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 34 ac Plus
Step / direction input

MDrive® 34ac Plus

P1: I/O & Communication, and optional encoder
19-pin M23 male industrial connector

P3: Integrated Power Supply
3-pin Euro AC male industrial connector

Part numbers

Example:	K	M	D	M	2	M	S	Z	3	4	A	1	–EA
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	M	2	M	S	Z	3	4	A	1	–EA
MDrive Plus version **MDM** = Step / direction input	K	**M**	**D**	**M**	2	M	S	Z	3	4	A	1	–EA
Version **2** = Universal input with industrial connectors, IP54-rated	K	M	D	M	**2**	M	S	Z	3	4	A	1	–EA
P1 connector **M** = M23 industrial connector	K	M	D	M	2	**M**	S	Z	3	4	A	1	–EA
Communication **S** = SPI	K	M	D	M	2	M	**S**	Z	3	4	A	1	–EA
P2 connector **Z** = not applicable	K	M	D	M	2	M	S	**Z**	3	4	A	1	–EA
Motor size **34** = NEMA 34 (3.4" / 86 mm)	K	M	D	M	2	M	S	Z	**3**	**4**	A	1	–EA
Motor length **A** = single stack **B** = double stack **C** = triple stack	K	M	D	M	2	M	S	Z	3	4	**A**	1	–EA
Drive voltage **1** = 120 VAC **2** = 240 VAC	K	M	D	M	2	M	S	Z	3	4	A	**1**	–EA
Options Leave blank if not wanted Options may be combined													**–EA**

–E___ = internal optical encoder with index mark

line count	100	200	250	256	400	500	512	1000	1024
differential part #	EA	EB	EC	EW	ED	EH	EX	EJ	EY

–N = rear control knob for manual positioning *(1)*

(1) Not IP54-rated.

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® Plus
Motion Control

MDrive® Plus
Motion Control
fully programmable

MDrive®Plus Motion Control, fully programmable

Presentation

The MDrive® Plus Motion Control is a 1.8° 2-phase stepper motor with on-board fully programmable motion controller, drive electronics and optional encoder. This means MDrive Plus Motion Control products are stand-alone motion control solutions that can be used without any external controller.MDrive products come standard with RS-422/485 serial interface. Programming is with MCode, simple 1 to 2 character instructions, using the IMS Terminal software tool.

Size 23 MDrive products are also available for ModbusTCP protocol. Programming is with the same MCode instruction set used for the RS-422/485 products. ModbusTCP products support the application protocol per specification Version 1.1b, with operation in immediate mode, not as programmable products.

MDrive Plus Motion Control products may be equipped with encoders for stall detection, position maintenance and find index mark.

Application areas

The MDrive Plus Motion Control is ideal for machine builders who want an optimized motor with on-board electronics. The integrated electronics of the fully programmable MDrive Plus Motion Control reduces the potential for problems due to electrical noise by eliminating the cable between motor and drive.

These compact, powerful and cost effective motion control solutions deliver unsurpassed smoothness and performance that will reduce system cost, design and assembly time for a large range of 2-phase stepper motor applications.

Features

Standard Plus

- Highly integrated microstepping drive and high torque 1.8° 2-phase stepper motor
- Advanced current control for exceptional performance and smoothness
- Single supply: from +12 up to +75 VDC or 120 and 240 VAC
- Cost effective
- Extremely compact
- 20 microstep resolutions to 51,200 steps/rev including: Degrees, Metric, Arc Minutes
- Auxiliary logic power supply input
- Open or optional closed loop control
- Programmable motor run and hold currents
- Four +5 to +24 VDC I/O lines accept sinking outputs, or sourcing and sinking inputs
- One 10 bit analog input selectable: 0 to +10 VDC, 0 to +5 VDC, 0-20 mA, 4-20 mA
- 0 to 5 MHz step clock rate selectable in 0.59 Hz increments
- RS-422/485 or ModbusTCP communication protocols *(1)*
- 62 software addresses for multi-drop communications *(2)*
- Simple 1 to 2 character instructions
- Available options:
  - Long life linear actuators *(3)*
  - Hybrid Motion Technology™ *(3)*
  - Encoders
  - Control knob for manual positioning
  - Industrial connectors with IP54 rating *(4)*
- Several motor stack lengths available
- Graphical user interface provided for quick and easy configuration and programming

Expanded Plus²

- +24 VDC tolerant I/O sourcing or sinking, inputs and outputs with up to 8 I/O lines and electronic gearing
- Closed loop control available with external / remote encoder option
- High speed position capture input or trip output

(1) ModbusTCP only available for MDrive23Plus² products.
(2) Only with RS-422/485 products.
(3) See separate documentation.
(4) Industrial connectors are unavailable for MDrive14 or MDrive34 products.

MDrive® Plus
Motion Control
fully programmable

Standard Plus specifications

			MDrive 14	MDrive 17	MDrive 23 *(1)*	MDrive 23 *(1)*	MDrive 34	MDrive 34ac *(2)*	
Input power	Voltage	VDC	12 to 48	12 to 48	12 to 75	12 to 60	12 to 75	—	—
		VAC	—	—	—	—	—	120	240
	Current maximum *(3)*		1A	2A	2A	3.5A	4A	95 to 132 VAC @ 50/60 Hz	95 to 264 VAC @ 50/60 Hz
Thermal	Operating temp non-condensing	Heat sink	–40° to +85°C				–40° to +75°C		
		Motor	–40° to +100°C				–40° to +90°C		
Protection	Type		not applicable					- Thermal - Over voltage / current	

Aux. logic input voltage	Range	+12 to +24 VDC *When input voltage is removed, maintains power only to control and feedback circuits. (4)*		
Analog input	Resolution	10 bit		
	Voltage range	0 to +5 VDC, 0 to +10 VDC, 0-20 mA, 4-20 mA		
General purpose I/O	Number	4		
	Type	sourcing or sinking inputs, or sinking outputs		
	Logic range	Inputs and outputs tolerant to +24 VDC, inputs TTL level compatible		
	Output sink current	Up to 600 mA		
	Protection	Over temp, short circuit, transient, over voltage, inductive clamp		
Communication	Type	RS-422/485		
	Baud rate	4.8 to 115.2 kbps		
Motion	Open loop configuration	Number of settings	20	
		Steps per revolution	200, 400, 800, 1000, 1600, 2000, 3200, 5000, 6400, 10000, 12800, 20000, 25000, 25600, 40000, 50000, 51200, 36000 (0.01 deg/µstep), 21600 (1 arc minute/µstep), 25400 (0.001mm/µstep)	
	Closed loop configuration (requires encoder option)	Encoder resolution	512 lines / 2048 edges per rev	
	Counters	Type	position, encoder / 32 bit	
		Edge rate maximum	5 MHz	
	Velocity	Range	+/- 5,000,000 steps per second	
		Resolution	0.5961 steps per second	
	Accel / Decel	Range	1.5 x 10^9 steps per second^2	
		Resolution	90.9 steps per second^2	
Software	Program storage	Type / size	flash / 6384 bytes	
	User registers	Four 32 bit		
	User program labels & variables	192		
	Math functions	+, –, ×, ÷, >, <, =, <=, >=, AND, OR, XOR, NOT		
	Branch functions	Branch and Call		
	General purpose I/O functions	Inputs	home, limit plus, limit minus, go, stop, pause, jog plus, jog minus, general purpose	
		Outputs	moving, fault, stall, velocity change, general purpose	
	Trip functions	Trip on input, trip on position, trip on time, trip capture, trip on relative position		
	Party mode addresses	62 *(4)*		
	Encoder functions	Stall detection, position maintenance, find index		

Expanded Plus^2 specifications

General purpose I/O	Number	8 (or 4 with either remote encoder option or ModbusTCP protocol)		
	Type	sourcing or sinking outputs / inputs		
	Logic range	Sourcing outputs +12 to +24 VDC, inputs and sinking outputs tolerant to +24 VDC, inputs TTL level compatible		
	Output sinking current	Up to 600 mA		
Communication	Type	RS-422/485 or ModbusTCP *(5)*		
Motion	Electronic gearing	Range / resolution/ threshold – external clock in *(6)*		0.001 to 2.000 / 32 bit / TTL
		Input filter range		50 nS to 12.9 µS (10 MHz to 38.8 kHz)
		Range – secondary clock out *(6)*		1 to 1
	High speed I/O	Position capture	Input filter range	50 nS to 12.9 µS (10 MHz to 38.8 kHz)
			Resolution	32 bit
		Trip output – speed / resolution / threshold		150 nS / 32 bit / TTL
	Closed loop configuration (requires remote encoder)	Steps per revolution		Same as Standard Plus specification shown in section above
		Encoder type		User-supplied differential encoder
		Encoder resolution		User-defined

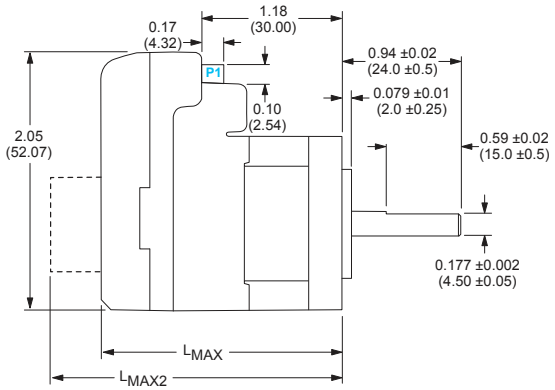
(1) Only quad stack NEMA 23 motors have +12 to +60 VDC drives, all other NEMA 23 motors have +12 to +75 VDC drives.
(2) Only available as Plus^2 products.
(3) Actual power supply current will depend on voltage and load.
(4) Not available with ModbusTCP products.
(5) ModbusTCP only available with MDrive23 Plus^2 products.
(6) Adjusting the microstep resolution can increase the range.

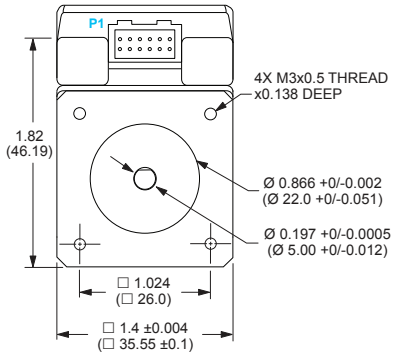
MDrive® 14 Plus
Motion Control
fully programmable

– Plus – mechanical specifications, dimensions in inches (mm)

I/O, Power & Comm

P1: 12-pin locking wire crimp connector

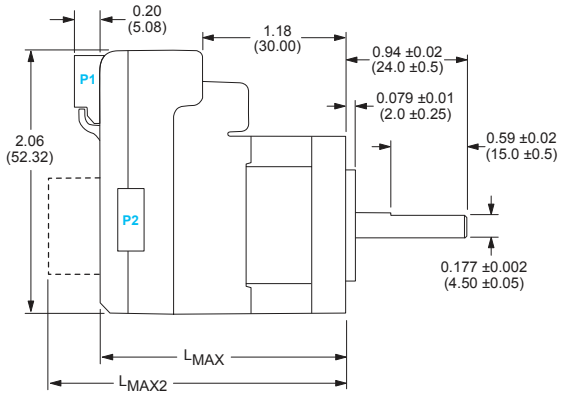


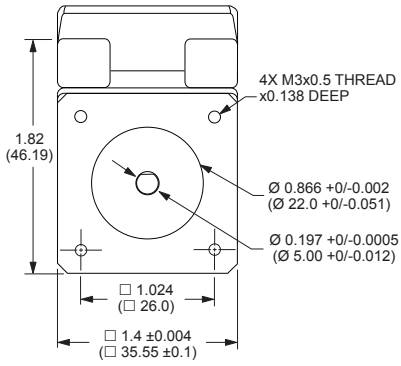


Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	1.93 (49.02)	2.62 (66.55)
Triple	3.03 (76.96)	3.73 (94.74)

(1) Single shaft or internal encoder.
(2) Control knob.

– Plus² – mechanical specifications, dimensions in inches (mm)



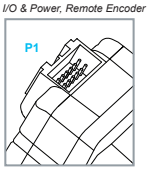


Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	1.93 (49.02)	2.62 (66.55)
Triple	3.03 (76.96)	3.73 (94.74)

(1) Single shaft or internal encoder.
(2) Control knob.

P1 connector

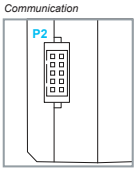
I/O & Power, Remote Encoder



16-pin locking wire crimp connector

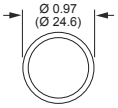
P2 connector

Communication



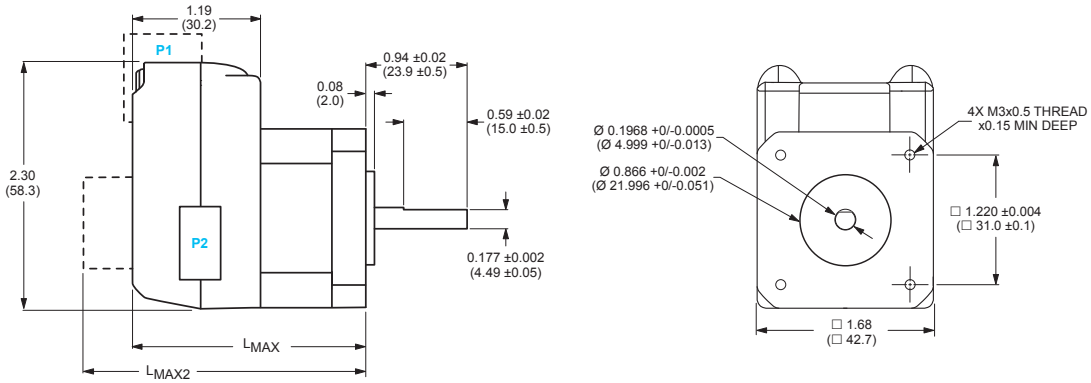
10-pin friction lock wire crimp connector

Lmax2 option



control knob

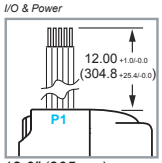
– Plus & Plus² – mechanical specifications, dimensions in inches (mm)



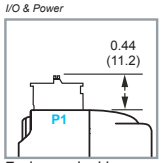
Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	2.20 (55.9)	2.79 (70.9)
Double	2.43 (61.7)	3.02 (76.7)
Triple	2.77 (70.4)	3.37 (85.6)

(1) Single shaft or internal encoder.
(2) Control knob or external encoder.

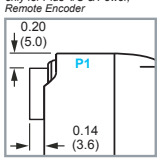
P1 connector options



12.0" (305mm) flying leads

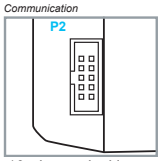


7-pin non-locking spring clamp terminal strip

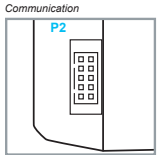


16-pin locking wire crimp connector

P2 connector options

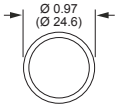


10-pin non-locking IDC connector



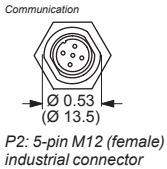
10-pin friction lock wire crimp connector

Lmax2 option

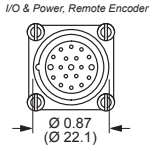


control knob

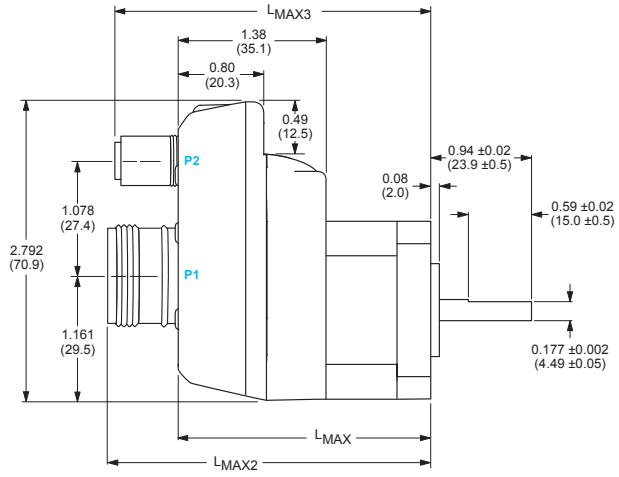
– Plus² with industrial connectors – mechanical specifications, dimensions in inches (mm)

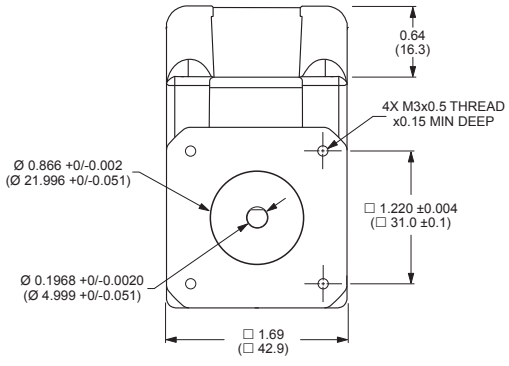


P2: 5-pin M12 (female) industrial connector



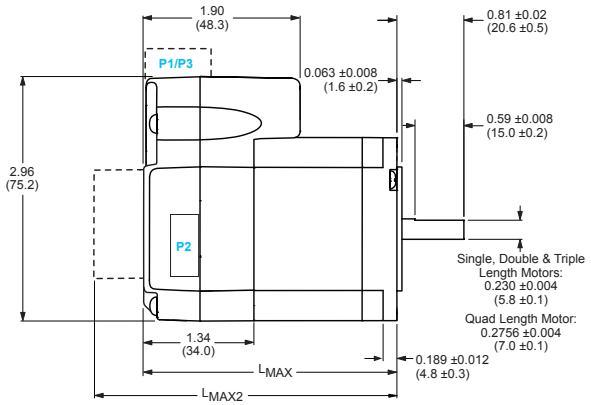
P1: 19-pin M23 (male) industrial connector

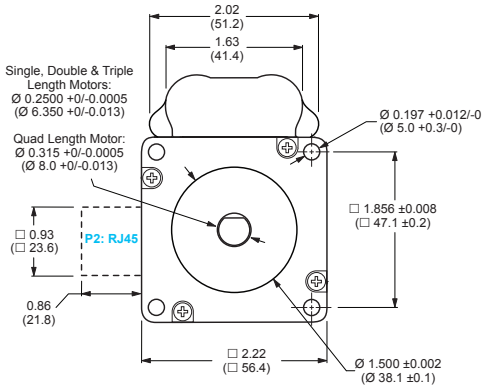




Motor stack length	Lmax	Lmax2	Lmax3
Single	2.39 (60.71)	3.06 (77.72)	2.99 (75.95)
Double	2.62 (66.55)	3.29 (83.57)	3.22 (81.79)
Triple	2.96 (75.18)	3.63 (92.20)	3.56 (90.42)

– Plus & Plus² – mechanical specifications, dimensions in inches (mm)

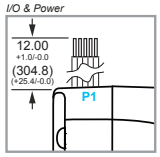




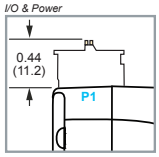
Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	2.65 (67.31)	3.36 (85.34)
Double	3.02 (76.71)	3.73 (94.74)
Triple	3.88 (98.55)	4.59 (116.59)
Quad	5.28 (134.15)	5.99 (152.19)

(1) Single shaft or internal encoder.
(2) Control knob or external encoder.

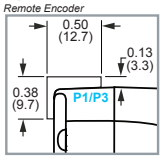
P1 connector options



12.0" (305mm) flying leads

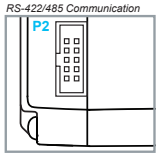


7-pin non-locking spring clamp terminal strip

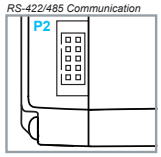


14- & 2-pin locking wire crimp connectors

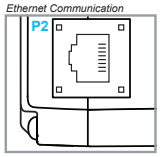
P2 connector options



10-pin non-locking IDC connector

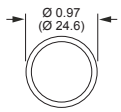


10-pin friction lock wire crimp connector



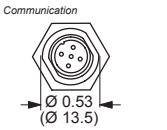
RJ45 connector for Ethernet only

Lmax2 option

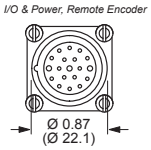


control knob

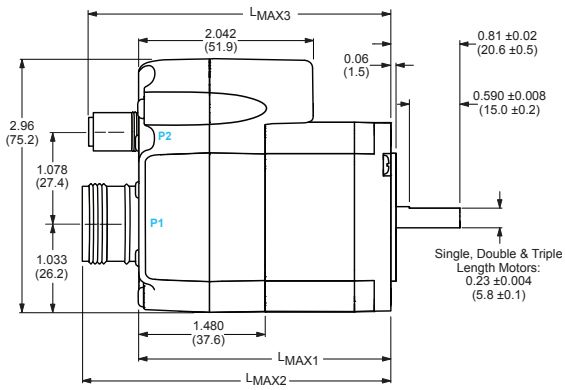
– Plus² with industrial connectors – mechanical specifications, dimensions in inches (mm)

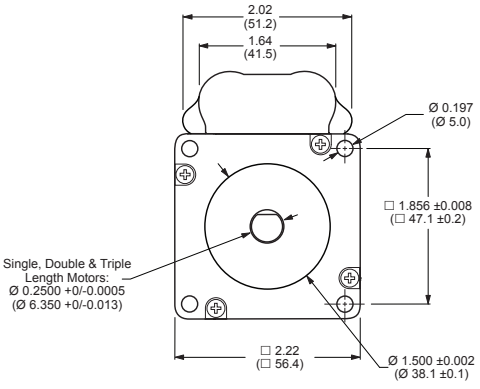


P2: 5-pin M12 (female) industrial connector



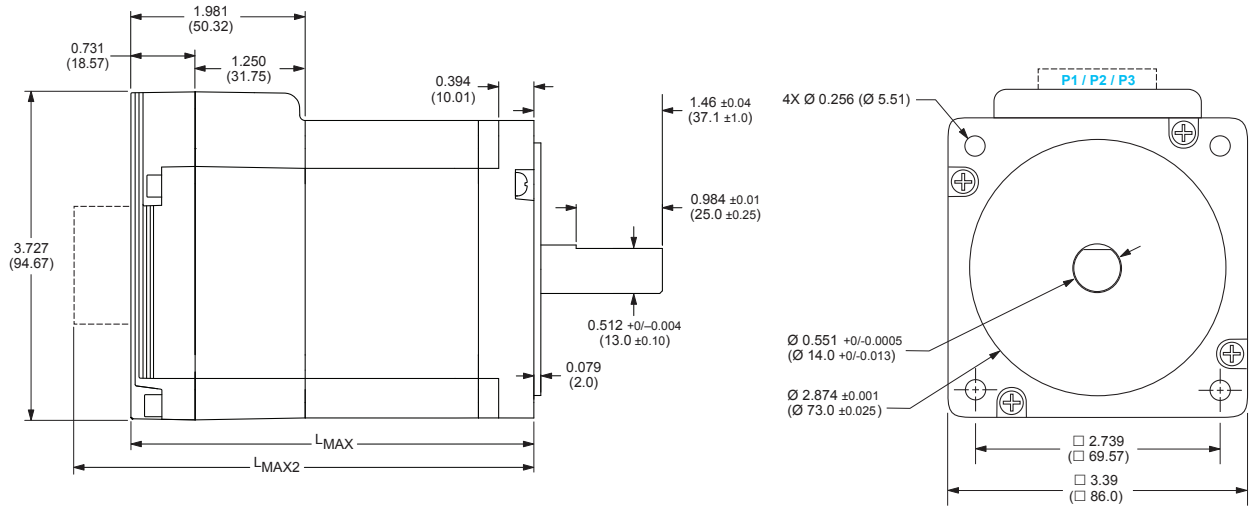
P1: 19-pin M23 (male) industrial connector





Motor stack length	Lmax	Lmax2	Lmax3
Single	2.82 (71.63)	3.48 (88.39)	3.42 (86.87)
Double	3.16 (80.26)	3.82 (97.03)	3.76 (95.5)
Triple	4.02 (102.11)	4.67 (118.62)	4.62 (117.35)

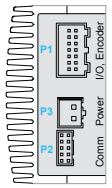
– Plus & Plus² – mechanical specifications, dimensions in inches (mm)



Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	3.81 (96.77)	4.52 (114.81)
Double	4.60 (116.84)	5.31 (134.87)
Triple	6.17 (156.72)	6.88 (174.75)

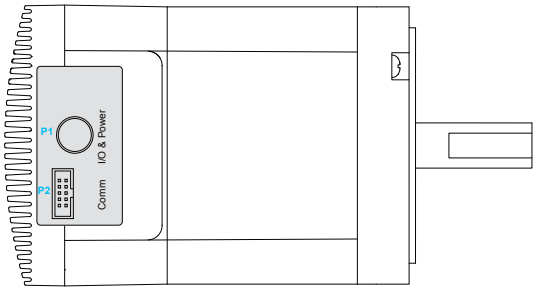
(1) Single shaft or internal encoder.
(2) Control knob.

Connector options



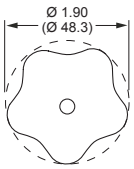
Pluggable interface version:
14-pin and 2-pin locking wire crimp and*
10-pin friction lock wire crimp connectors

** 14-pin replaced by 20-pin locking wire crimp connector when optional remote encoder is included*



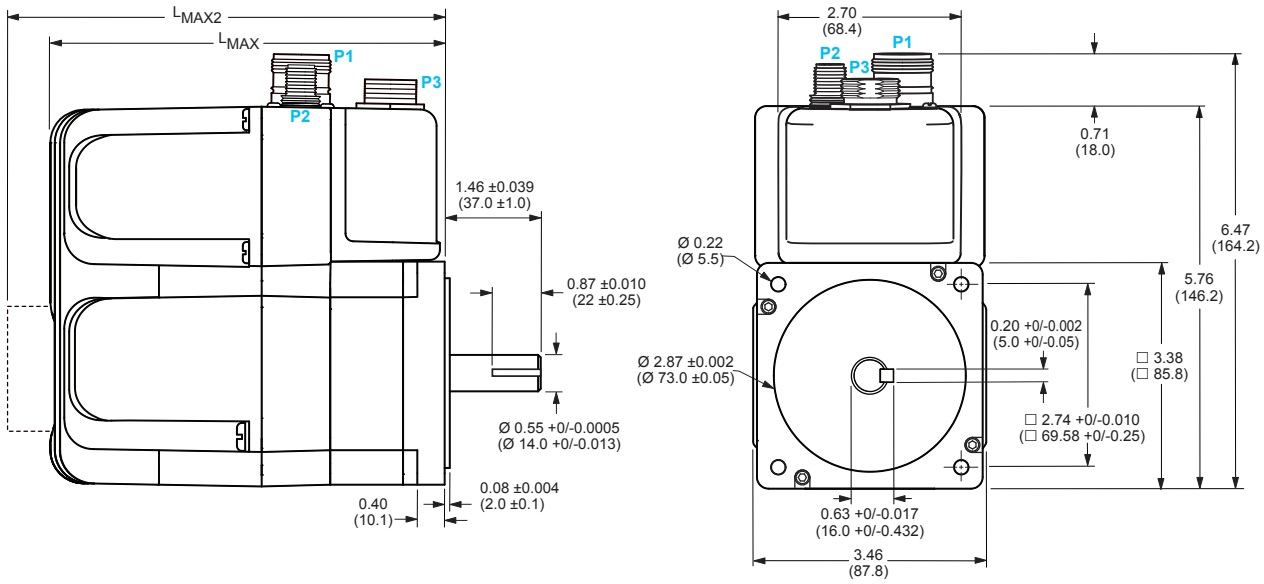
Flying leads interface version:
12" (305mm) flying leads with
10-pin non-locking IDC connector

Lmax2 option



control knob

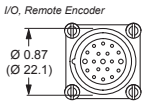
– Plus² with industrial connectors – mechanical specifications, dimensions in inches (mm)



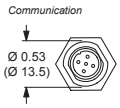
Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	6.1 (155.0)	7.1 (180.4)
Double	6.9 (174.3)	7.9 (199.7)
Triple	8.4 (214.3)	9.4 (239.7)

(1) Single shaft or internal encoder.
(2) Control knob.

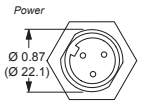
Connectors



P1: 19-pin M23 (male) industrial connector

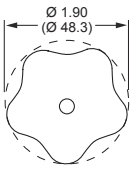


P2: 5-pin M12 (female) industrial connector



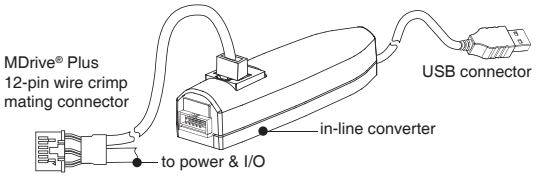
P3: 3-pin Euro AC (male) industrial connector

Lmax2 option

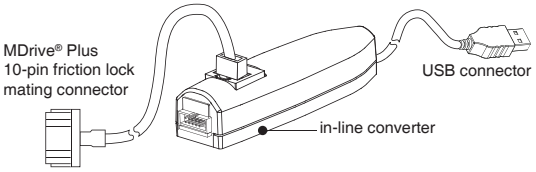


control knob

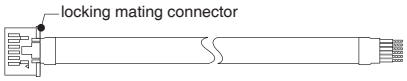
MDrive® 14 Plus
Motion Control
fully programmable



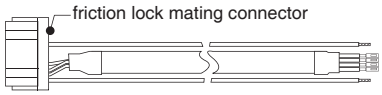
MD-CC403-001



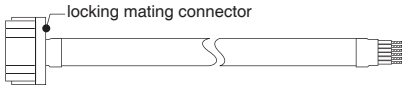
MD-CC402-001



PD12B-1434-FL3



PD10-1434-FL3



PD16-1417-FL3

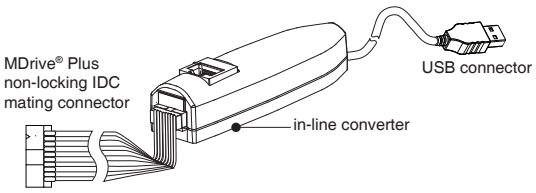
Installation accessories

Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For MDrive14 Motion Control products	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 12-pin locking wire crimp connector	12.0 (3.6)	**MD-CC403-001**
■ Mates to 10-pin friction lock wire crimp connector	12.0 (3.6)	**MD-CC402-001**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 12-pin locking wire crimp connector for I/O, communication and power	10.0 (3.0)	**PD12B-1434-FL3**
■ Mates to 10-pin friction lock wire crimp connector for communication	10.0 (3.0)	**PD10-1434-FL3**
■ Mates to 16-pin locking wire crimp connector for I/O, power and remote encoder option	10.0 (3.0)	**PD16-1417-FL3**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 12-pin locking wire crimp connector for I/O, communication and power	—	**CK-08**
■ 10-pin friction lock wire crimp connector for communication	—	**CK-02**
■ 16-pin locking wire crimp connector for I/O, power and remote encoder option	—	**CK-10**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive14 Motion Control products	—	**DPM75**

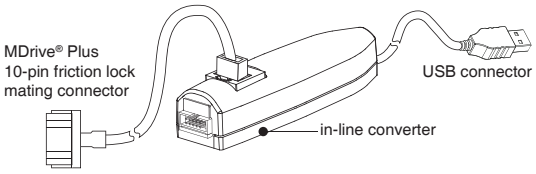
(1) See page 36.

Connectivity details: www.motion.schneider-electric.com/connect.html

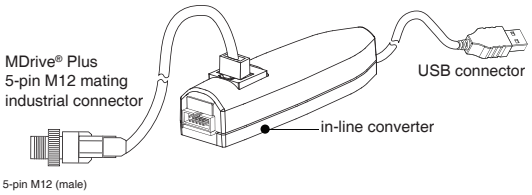
MDrive® 17 Plus
Motion Control
fully programmable



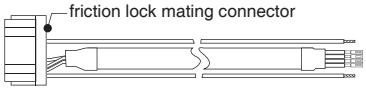
MD-CC400-001



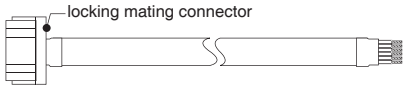
MD-CC402-001



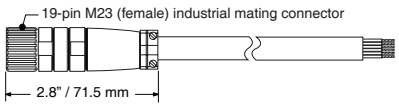
MD-CC401-001



PD10-1434-FL3



PD16-1417-FL3



MD-CS100-000

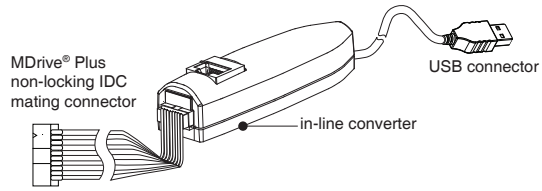
Installation accessories

Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For MDrive17 Motion Control products	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 10-pin non-locking IDC connector	12.0 (3.6)	**MD-CC400-001**
■ Mates to 10-pin friction lock wire crimp connector	12.0 (3.6)	**MD-CC402-001**
■ Mates to 5-pin female M12 industrial connector	12.0 (3.6)	**MD-CC401-001**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 10-pin friction lock wire crimp connector for communication	10.0 (3.0)	**PD10-1434-FL3**
■ Mates to 16-pin locking wire crimp connector for I/O, power and remote encoder option	10.0 (3.0)	**PD16-1417-FL3**
■ Mates to 19-pin male M23 industrial connector with straight termination for I/O, power and remote encoder option	13.0 (4.0)	**MD-CS100-000**
■ Mates to 19-pin male M23 industrial connector with right angle termination for I/O, power and remote encoder option	13.0 (4.0)	**MD-CS101-000**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 10-pin friction lock wire crimp connector for communication	—	**CK-02**
■ 10-pin non-locking IDC connector for communication	—	**CK-01**
■ 16-pin locking wire crimp connector for I/O, power and remote encoder option	—	**CK-10**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive17 Motion Control products	—	**DPM75**

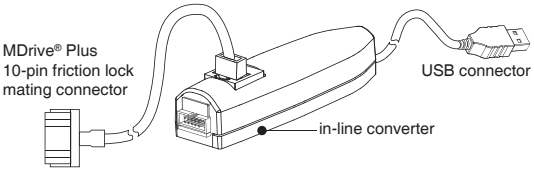
(1) See page 37.

Connectivity details: www.motion.schneider-electric.com/connect.html

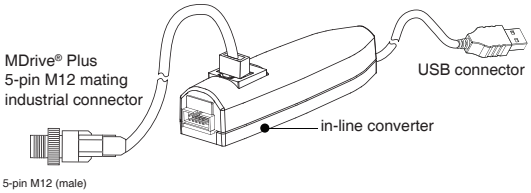
MDrive® 23 Plus
Motion Control
fully programmable



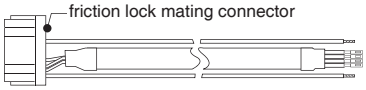
MD-CC400-001



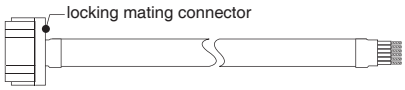
MD-CC402-001



MD-CC401-001

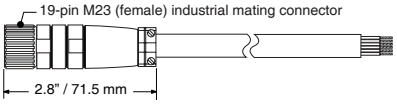


PD10-1434-FL3



PD14-2334-FL3

PD02-2300-FL3



MD-CS100-000

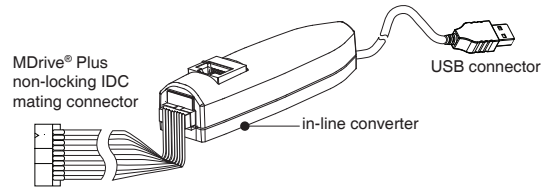
Installation accessories

Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For MDrive23 Motion Control products	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 10-pin non-locking IDC connector	12.0 (3.6)	**MD-CC400-001**
■ Mates to 10-pin friction lock wire crimp connector	12.0 (3.6)	**MD-CC402-001**
■ Mates to 5-pin female M12 industrial connector	12.0 (3.6)	**MD-CC401-001**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 10-pin friction lock wire crimp connector for communication	10.0 (3.0)	**PD10-1434-FL3**
■ Mates to 14-pin locking wire crimp connector for I/O and remote encoder option	10.0 (3.0)	**PD14-2334-FL3**
■ Mates to 2-pin locking wire crimp connector for power	10.0 (3.0)	**PD02-2300-FL3**
■ Mates to 19-pin male M23 industrial connector with straight termination for I/O, power and remote encoder option	13.0 (4.0)	**MD-CS100-000**
■ Mates to 19-pin male M23 industrial connector with right angle termination for I/O, power and remote encoder option	13.0 (4.0)	**MD-CS101-000**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 10-pin friction lock wire crimp connector for communication	—	**CK-02**
■ 10-pin non-locking IDC connector for communication	—	**CK-01**
■ 14-pin locking wire crimp connector for I/O and remote encoder option	—	**CK-09**
■ 2-pin locking wire crimp connector for power	—	**CK-04**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive23 Motion Control products	—	**DPM75**

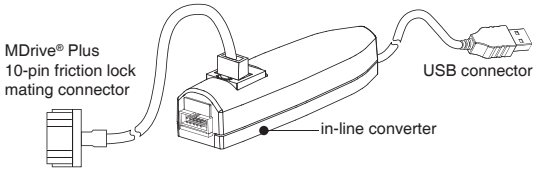
(1) See page 38.

Connectivity details: www.motion.schneider-electric.com/connect.html

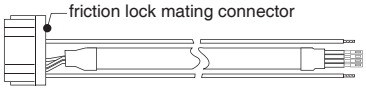
MDrive® 34 Plus
Motion Control
fully programmable



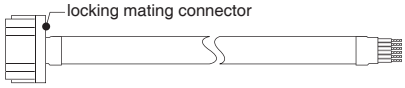
MD-CC400-001



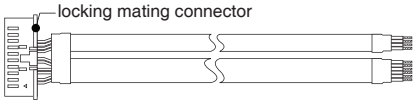
MD-CC402-001



PD10-1434-FL3



PD14-2334-FL3



PD20-3400-FL3

PD02-3400-FL3

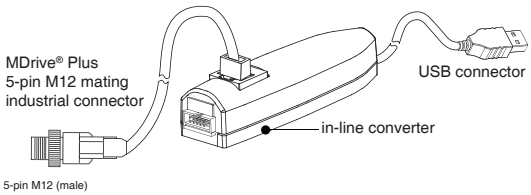
Installation accessories

Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For MDrive34 Motion Control products	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 10-pin non-locking IDC connector	12.0 (3.6)	**MD-CC400-001**
■ Mates to 10-pin friction lock wire crimp connector	12.0 (3.6)	**MD-CC402-001**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 10-pin friction lock wire crimp connector for communication	10.0 (3.0)	**PD10-1434-FL3**
■ Mates to 14-pin locking wire crimp connector for I/O and optional internal encoder	10.0 (3.0)	**PD14-2334-FL3**
■ Mates to 20-pin locking wire crimp connector for I/O and remote encoder option	10.0 (3.0)	**PD20-3400-FL3**
■ Mates to 2-pin locking wire crimp connector for power	10.0 (3.0)	**PD02-3400-FL3**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 10-pin friction lock wire crimp connector for communication	—	**CK-02**
■ 14-pin locking wire crimp connector for I/O and optional internal encoder	—	**CK-09**
■ 20-pin locking wire crimp connector for I/O and remote encoder option	—	**CK-11**
■ 2-pin locking wire crimp connector for power	—	**CK-05**
■ 10-pin non-locking IDC connector for communication	—	**CK-01**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive34 Motion Control products	—	**DPM75**

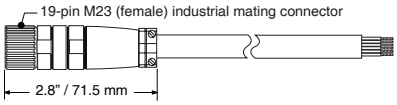
(1) See page 39.

Connectivity details: www.motion.schneider-electric.com/connect.html

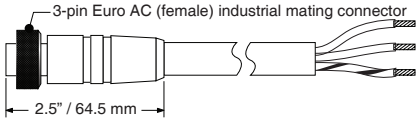
MDrive® 34 ac Plus
Motion Control
fully programmable



MD-CC401-001



MD-CS100-000



MD-CS200-000

Installation accessories

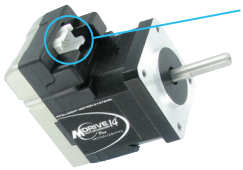
Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For MDrive34ac Motion Control products	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 5-pin female M12 industrial connector	12.0 (3.6)	**MD-CC401-001**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 19-pin male M23 industrial connector with straight termination for I/O and remote encoder option	13.0 (4.0)	**MD-CS100-000**
■ Mates to 19-pin male M23 industrial connector with right angle termination for I/O and remote encoder option	13.0 (4.0)	**MD-CS101-000**
■ Mates to 3-pin male Euro AC industrial connector with straight termination for power	13.0 (4.0)	**MD-CS200-000**
■ Mates to 3-pin male Euro AC industrial connector with right angle termination for power	13.0 (4.0)	**MD-CS201-000**

(1) See page 40.

Connectivity details: www.motion.schneider-electric.com/connect.html

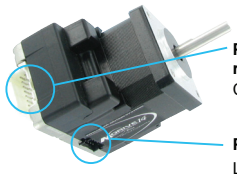
MDrive® 14 Plus
Motion Control
fully programmable

MDrive® 14 Plus



P1: I/O, Power & Communication
C = 12-pin locking wire crimp connector

MDrive® 14 Plus²



P1: I/O & Power, and optional remote encoder
C = 16-pin locking wire crimp connector

P2: Communication
L = RS-422/485 with 10-pin friction lock wire crimp connector

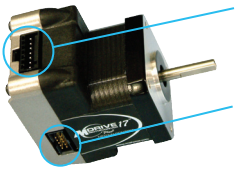
Part numbers

Example:	K	M	D	I	1	C	R	Z	1	4	A	4	–EQ
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	I	1	C	R	Z	1	4	A	4	–EQ
MDrive Plus version **MDI** = Motion Control	K	**M**	**D**	**I**	1	C	R	Z	1	4	A	4	–EQ
Input **1** = Plus, standard features **3** = Plus², expanded features	K	M	D	I	**1**	C	R	Z	1	4	A	4	–EQ
P1 connector **C** = wire crimp	K	M	D	I	1	**C**	R	Z	1	4	A	4	–EQ
Communication **R** = RS-422/485	K	M	D	I	1	C	**R**	Z	1	4	A	4	–EQ
P2 connector **Z** = none (only for Plus products) **L** = wire crimp (only for Plus² products)	K	M	D	I	1	C	R	**Z**	1	4	A	4	–EQ
Motor size **14** = NEMA 14 (1.4" / 36 mm)	K	M	D	I	1	C	R	Z	**1**	**4**	A	4	–EQ
Motor length **A** = single stack **C** = triple stack	K	M	D	I	1	C	R	Z	1	4	**A**	4	–EQ
Drive voltage **4** = +12 to +48 VDC	K	M	D	I	1	C	R	Z	1	4	A	**4**	–EQ
Options Leave blank if not wanted Options may be combined, unless noted **–EQ** = internal encoder, 512-line internal magnetic encoder with index mark **–EE** = remote encoder interface, differential encoder to be provided by user *Available with Plus² versions only. May not be combined with internal encoder option.* **–N** = rear control knob for manual positioning													**–EQ**

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 17 Plus
Motion Control
fully programmable

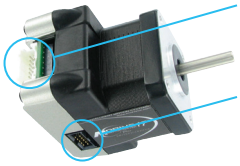
MDrive® 17 Plus



P1: I/O & Power
F = 12" flying leads
P = non-locking spring clamp terminal strip

P2: Communication
D = RS-422/485 with 10-pin IDC non-locking connector
L = RS-422/485 with 10-pin friction lock wire crimp connector

MDrive® 17 Plus²



P1: I/O & Power, and optional remote encoder
C = 16-pin locking wire crimp connector

P2: Communication
D = RS-422/485 with 10-pin IDC non-locking connector
L = RS-422/485 with 10-pin friction lock wire crimp connector

MDrive® 17 Plus²
with industrial connectors

P2: Communication
Q = RS-422/485 with 5-pin M12 female industrial connector

P1: I/O & Power, and optional remote encoder
M = 19-pin M23 male industrial connector

Part numbers

Example:	K	M	D	I	1	F	R	D	1	7	A	4	–EQ
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	I	1	F	R	D	1	7	A	4	–EQ
MDrive Plus version **MDI** = Motion Control	K	**M**	**D**	**I**	1	F	R	D	1	7	A	4	–EQ
Input **1** = Plus, standard features **3** = Plus², expanded features **4** = Plus², expanded features, with industrial connectors, IP54-rated	K	M	D	I	**1**	F	R	D	1	7	A	4	–EQ
P1 connector **F** = flying leads **P** = pluggable **C** = wire crimp *(1)* **M** = M23 industrial connector *(2)*	K	M	D	I	1	**F**	R	D	1	7	A	4	–EQ
Communication **R** = RS-422/485	K	M	D	I	1	F	**R**	D	1	7	A	4	–EQ
P2 connector **D** = IDC **L** = wire crimp **Q** = M12 industrial connector *(2)*	K	M	D	I	1	F	R	**D**	1	7	A	4	–EQ
Motor size **17** = NEMA 17 (1.7" / 42 mm)	K	M	D	I	1	F	R	D	**1**	**7**	A	4	–EQ
Motor length **A** = single stack **B** = double stack **C** = triple stack	K	M	D	I	1	F	R	D	1	7	**A**	4	–EQ
Drive voltage **4** = +12 to +48 VDC	K	M	D	I	1	F	R	D	1	7	A	**4**	–EQ
Options Leave blank if not wanted Options may be combined, unless noted													**–EQ**

–EQ = internal encoder, 512-line internal magnetic encoder with index mark

–EE = remote encoder interface, differential encoder to be provided by user
Available with Plus² versions only. May not be combined with internal encoder option.

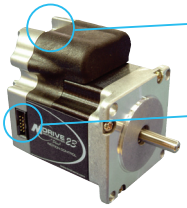
–N = rear control knob for manual positioning *(3)*

(1) Only available with Plus² products without industrial connectors.
(2) Only available with Plus² products with industrial connectors.
(3) Not available with industrial connector products.

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 23 Plus
Motion Control
fully programmable

MDrive® 23 Plus



P1: I/O & Power
F = 12" flying leads
P = non-locking spring clamp terminal strip

P2: Communication
D = RS-422/485 with 10-pin IDC non-locking connector
L = RS-422/485 with 10-pin friction lock wire crimp connector

MDrive® 23 Plus²

P1: I/O, and optional remote encoder
C = 14-pin locking wire crimp connector

P3: Power
2-pin locking wire crimp connector

P2: Communication
D = RS-422/485 with 10-pin IDC non-locking connector
L = RS-422/485 with 10-pin friction lock wire crimp connector
R = ModbusTCP with RJ45 locking connector

MDrive® 23 Plus²
with industrial connectors

P2: Communication
Q = RS-422/485 with 5-pin M12 female industrial connector

P1: I/O & Power, and optional remote encoder
M = 19-pin M23 male industrial connector

Part numbers

Example:	K	M	D	I	1	F	R	D	2	3	A	7	–EQ
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	I	1	F	R	D	2	3	A	7	–EQ
MDrive Plus version **MDI** = Motion Control	K	**M**	**D**	**I**	1	F	R	D	2	3	A	7	–EQ
Input **1** = Plus, standard features **3** = Plus², expanded features **4** = Plus², expanded features, with industrial connectors, IP54-rated *(1)*	K	M	D	I	**1**	F	R	D	2	3	A	7	–EQ
P1 connector **F** = flying leads **P** = pluggable **C** = wire crimp *(2)* **M** = M23 industrial connector *(3)*	K	M	D	I	1	**F**	R	D	2	3	A	7	–EQ
Communication **R** = RS-422/485 **E** = ModbusTCP *(2)*	K	M	D	I	1	F	**R**	D	2	3	A	7	–EQ
P2 connector **D** = IDC **L** = wire crimp **R** = RJ45 *(4)* **Q** = M12 industrial connector *(3)*	K	M	D	I	1	F	R	**D**	2	3	A	7	–EQ
Motor size **23** = NEMA 23 (2.3" / 57 mm)	K	M	D	I	1	F	R	D	**2**	**3**	A	7	–EQ
Motor length *(4)* **A** = single stack **B** = double stack **C** = triple stack **D** = quad stack	K	M	D	I	1	F	R	D	2	3	**A**	7	–EQ
Drive voltage *(4)* **7** = +12 to +75 VDC **6** = +12 to +60 VDC	K	M	D	I	1	F	R	D	2	3	A	**7**	–EQ
Options Leave blank if not wanted Options may be combined, unless noted													**–EQ**

–EQ = internal encoder, 512-line internal magnetic encoder with index mark

–EE = remote encoder interface, differential encoder to be provided by user *(3) (5)*
May not be combined with internal encoder option.

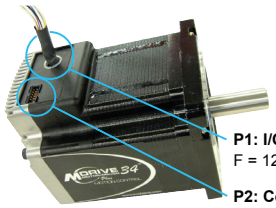
–N = rear control knob for manual positioning *(5)*

(1) Not available with quad stack motor.
(2) Only available with Plus² products without industrial connectors.
(3) Only available with Plus² products.
(4) Only quad stack motors have +12 to +60 VDC drives, all other motors have +12 to +75 VDC drives.
(5) Not available with ModbusTCP or products with industrial connectors.

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 34 Plus
Motion Control
fully programmable

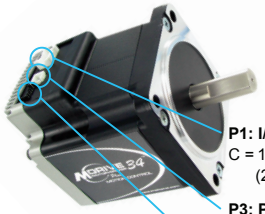
MDrive® 34 Plus
flying leads interface



P1: I/O & Power
F = 12" flying leads

P2: Communication
D = RS-422/485 with 10-pin IDC non-locking connector
L = RS-422/485 with 10-pin friction lock wire crimp connector

MDrive® 34 Plus²
pluggable interface



P1: I/O, and optional remote encoder
C = 14-pin locking wire crimp connector (20-pin with remote encoder option)

P3: Power
2-pin locking wire crimp connector

P2: Communication
L = RS-422/485 with 10-pin friction lock wire crimp connector

Part numbers

Example:	K	M	D	I	1	F	R	D	3	4	A	7	–EQ
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	I	1	F	R	D	3	4	A	7	–EQ
MDrive Plus version **MDI** = Motion Control	K	**M**	**D**	**I**	1	F	R	D	3	4	A	7	–EQ
Input **1** = Plus, standard features **3** = Plus², expanded features	K	M	D	I	**1**	F	R	D	3	4	A	7	–EQ
P1 connector **F** = flying leads *(1)* **C** = wire crimp *(2)*	K	M	D	I	1	**F**	R	D	3	4	A	7	–EQ
Communication **R** = RS-422/485	K	M	D	I	1	F	**R**	D	3	4	A	7	–EQ
P2 connector **D** = IDC *(1)* **L** = wire crimp	K	M	D	I	1	F	R	**D**	3	4	A	7	–EQ
Motor size **34** = NEMA 34 (3.4" / 86 mm)	K	M	D	I	1	F	R	D	**3**	**4**	A	7	–EQ
Motor length **A** = single stack **B** = double stack **C** = triple stack	K	M	D	I	1	F	R	D	3	4	**A**	7	–EQ
Drive voltage **7** = +12 to +75 VDC	K	M	D	I	1	F	R	D	3	4	A	**7**	–EQ
Options Leave blank if not wanted Options may be combined, unless noted													**–EQ**

–EQ = internal encoder, 512-line internal optical encoder with index mark

–EE = remote encoder interface, differential encoder to be provided by user
Available with Plus² versions only. May not be combined with internal encoder option.

–N = rear control knob for manual positioning

(1) Only available with Plus products.
(2) Only available with Plus² products.

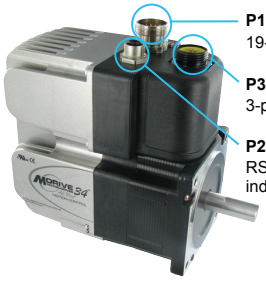
Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 34 ac Plus

Motion Control

fully programmable

MDrive® 34ac Plus[2]



P1: I/O, and optional remote encoder
19-pin M23 male industrial connector

P3: Integrated Power Supply
3-pin Euro AC male industrial connector

P2: Communication
RS-422/485 with 5-pin M12 female industrial connector

Part numbers

Example:	K	M	D	I	4	M	R	Q	3	4	A	1	–EQ
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	I	4	M	R	Q	3	4	A	1	–EQ
MDrive Plus version **MDI** = Motion Control	K	**M**	**D**	**I**	4	M	R	Q	3	4	A	1	–EQ
Input **4** = Plus[2], expanded features, with industrial connectors, IP54-rated	K	M	D	I	**4**	M	R	Q	3	4	A	1	–EQ
P1 connector **M** = M23 industrial connector	K	M	D	I	4	**M**	R	Q	3	4	A	1	–EQ
Communication **R** = RS-422/485	K	M	D	I	4	M	**R**	Q	3	4	A	1	–EQ
P2 connector **Q** = M12 industrial connector	K	M	D	I	4	M	R	**Q**	3	4	A	1	–EQ
Motor size **34** = NEMA 34 (3.4" / 86 mm)	K	M	D	I	4	M	R	Q	**3**	**4**	A	1	–EQ
Motor length **A** = single stack **B** = double stack **C** = triple stack	K	M	D	I	4	M	R	Q	3	4	**A**	1	–EQ
Drive voltage **1** = 120 VAC **2** = 240 VAC	K	M	D	I	4	M	R	Q	3	4	A	**1**	–EQ
Options Leave blank if not wanted Options may be combined, unless noted													**–EQ**

–EQ = internal encoder, 512-line internal magnetic encoder with index mark

–EE = remote encoder interface, differential encoder to be provided by user
May not be combined with internal encoder option.

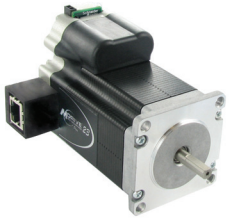
–N = rear control knob for manual positioning *(1)*

(1) Not IP54-rated.

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® Plus
EtherNet/IP

MDrive® Plus
EtherNet/IP™



MDrive® Plus EtherNet/IP

Presentation

MDrive® Plus EtherNet/IP™ products are compact motion solutions, integrating a stepper motor and electronics all in one package. MDrive EtherNet/IP products are ODVA™ compliant and interface with many manufacturer's systems, including Rockwell, Omron and Schneider Electric.

MDrive Plus EtherNet/IP products combine a 1.8° 2-phase stepper motor with on-board I/O and motion controller, drive electronics and optional internal encoder. As an adapter class device, these products are capable of explicit or implicit messaging.

MDrive EtherNet/IP products also support ModbusTCP protocol, per specification Version 1.1b. Operation is in immediate mode, not as programmable products. Communication may also be via MCode/TCP, a version of the MCode instruction set used for RS-422/485 serial communication products, adapted to utilize TCP/IP message formatting.

Configuration utility

MDrive EtherNet/IP products have a configuration port provided for setting the IP address. Windows-based TCP/IP Configuration Utility sets parameters and assembly object mapping.

Application areas

The MDrive EtherNet/IP product is ideal for machine builders who want an optimized motor with on-board electronics and support for the widely used Ethernet industrial protocol. MDrive products are compact motion control solutions that can reduce system cost, design and assembly time for a wide range of motor applications.

Features

- Highly integrated microstepping drive and high torque NEMA 23 1.8° 2-phase stepper motor
- Four +5 to +24 VDC I/O lines accept sourcing or sinking inputs or outputs
- Single supply: from +12 up to +75 VDC
- ODVA compliant
- Standard TCP/IP stack with virtually unlimited nodes
- Dynamic mapping of assembly object
- Explicit and implicit messaging
- Cost effective
- Extremely compact
- Advanced current control for exceptional performance and smoothness
- 20 microstep resolutions to 51,200 steps/rev including: Degrees, Metric, Arc Minutes
- Open or optional closed loop control
- Programmable motor run and hold currents
- High speed position capture input or trip output
- One 10 bit analog input selectable: 0 to +10 VDC, 0 to +5 VDC, 0-20 mA, 4-20 mA
- 0 to 5 MHz step clock rate selectable in 0.59 Hz increments
- Several motor stack lengths available
- Available options:
  - □ Encoder
  - □ Drive Protection Module
- Graphical user interface provided for quick and easy configuration

Specifications

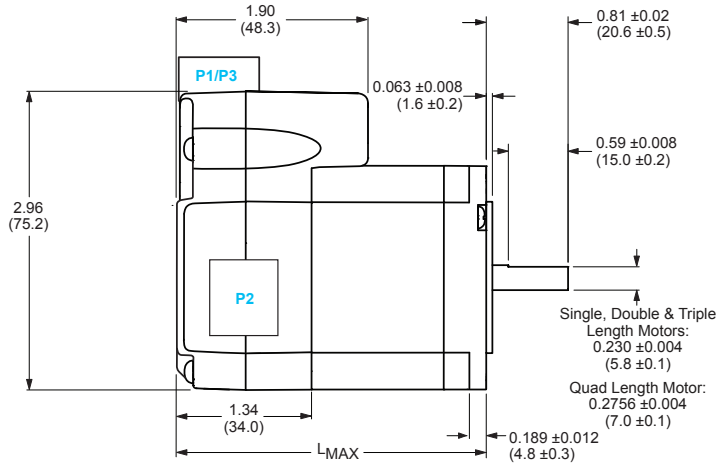
				MDrive 23 Plus
Input power	Voltage			12 to 75 VDC *(1)*
	Current maximum *(2)*			2A
Thermal	Operating temp non-condensing	Heat sink		–40° to +85°C
		Motor		–40° to +100°C
Analog input	Resolution			10 bit
	Voltage range			0 to +5 VDC, 0 to +10 VDC, 0-20 mA, 4-20 mA
General purpose I/O	Number			4
	Type			Sourcing or sinking outputs/inputs
	Logic range			Sourcing outputs +12 to 24 VDC, inputs&sinking outputs tolerant to +24 VDC, inputs TTL level compatible
	Output sink/source current			Up to 600 mA
	Protection			Over temp, short circuit, transient, over voltage, inductive clamp
Communication	Type			Ethernet TCP/IP
	Protocols			EtherNet/IP (ODVA compliant)
				ModbusTCP
				MCode/TCP on configuration port
	Baud rate			100 Mbps
	Configuration port			503
Motion	Open loop configuration	Number of settings		20
		Steps per revolution		200, 400, 800, 1000, 1600, 2000, 3200, 5000, 6400, 10000, 12800, 20000, 25000, 25600, 40000, 50000, 51200, 36000 (0.01 deg/µstep), 21600 (1 arc minute/µstep), 25400 (0.001mm/µstep)
	Counters	Type		Position, encoder/32 bit
		Edge rate maximum		5 MHz
	Closed loop configuration	Steps per revolution		512 lines/2048 edges per rev
		Encoder		Differential magnetic (requires option)
	Electronic gearing	External clock in *(3)*	Range	0.001 to 2.000
			Resolution	32 bit
			Threshold	TTL
		Input filter	Range	50 nS to 12.9 µS (10 MHz to 38.8 kHz)
		Secondary clock out *(3)*	Range	1 to 1
	High speed I/O	Position capture	Input filter range	50 nS to 12.9 µS (10 MHz to 38.8 kHz)
			Resolution	32 bit
		Trip output	Speed	150 nS
			Resolution	32 bit
			Threshold	TTL
	Velocity		Range	+/- 5,000,000 steps per second
			Resolution	0.5961 steps per second
	Accel/Decel		Range	1.5 x 10^9 steps per second^2
			Resolution	90.9 steps per second^2
EtherNet/IP	Device class			Adapter
	Message types			Explicit or implicit
	Assembly object 0x04	Output (T→O)		Instance 100
		Output (O→T)		Instance 112
		Mapping to MCode		Dynamic
	Device profile	Identity object		0x01
		Assembly object		0x04
		TCP object		0x05
		Ethernet link object		0xF6
		Manufacturer specific objects		0x64: Setup 0x65: Miscellaneous 0x66: Motion 0x67: Hardware inputs/outputs 0x68: Position 0x69: Encoder

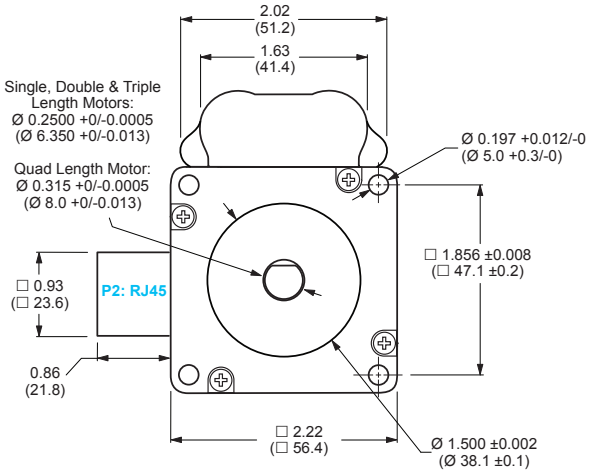
(1) All MDrivePlus motors have +12 to +75 VDC drives, except quad stack motors with +12 to +60 VDC.
(2) Actual power supply current will depend on voltage and load.
(3) Adjusting the microstep resolution can increase the range.

See User Manual for complete details: www.motion.schneider-electric.com/manuals.html

MDrive® 23 Plus
EtherNet/IP™

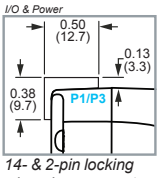
Mechanical specifications, dimensions in inches (mm)





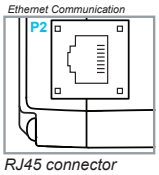
Motor stack length	Lmax
Single	2.65 (67.31)
Double	3.02 (76.71)
Triple	3.88 (98.55)
Quad	5.28 (134.15)

P1/P3 connectors



14- & 2-pin locking wire crimp connectors

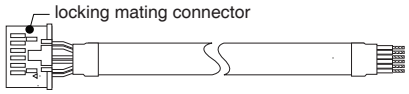
P2 connector



RJ45 connector

See User Manual for complete details: www.motion.schneider-electric.com/manuals.html

MDrive® 23 Plus
EtherNet/IP™



PD14-2334-FL3

PD02-2300-FL3

Installation accessories

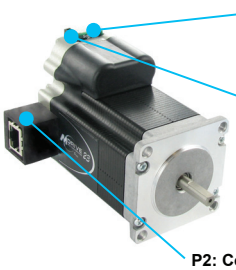
Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive product initial functional setup and system testing. Kit includes a 6.0' (1.8m) CAT5 cable with RJ45 ends, not sold alone.		
■ For all MDrive EtherNet/IP products	—	**add "K" to part number** *(1)*
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 14-pin locking wire crimp connector for I/O	10.0 (3.0)	**PD14-2334-FL3**
■ Mates to 2-pin locking wire crimp connector for power	10.0 (3.0)	**PD02-2300-FL3**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 14-pin locking wire crimp connector for I/O	—	**CK-09**
■ 2-pin locking wire crimp connector for power	—	**CK-04**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive product.		
■ For all MDrive EtherNet/IP products	—	**DPM75**

(1) See page 46.

Connectivity details: www.motion.schneider-electric.com/connect.html

MDrive® 23 Plus
EtherNet/IP™

MDrive® 23 Plus


P1: I/O
C = 14-pin locking wire crimp connector
P3: Power
2-pin locking wire crimp connector
P2: Communication
R = EtherNet/IP with RJ45 locking connector

Part numbers

Example:	K	M	D	I	3	C	I	R	2	3	A	7	–EQ
QuickStart Kit **K** = kit option, or leave blank if unwanted	**K**	M	D	I	3	C	I	R	2	3	A	7	–EQ
MDrive Plus version **MDI** = Ethernet	K	**M**	**D**	**I**	3	C	I	R	2	3	A	7	–EQ
Input **3** = expanded features	K	M	D	I	**3**	C	I	R	2	3	A	7	–EQ
P1 connector **C** = wire crimp	K	M	D	I	3	**C**	I	R	2	3	A	7	–EQ
Communication **I** = EtherNet/IP	K	M	D	I	3	C	**I**	R	2	3	A	7	–EQ
P2 connector **R** = RJ45	K	M	D	I	3	C	I	**R**	2	3	A	7	–EQ
Motor size **23** = NEMA 23 (2.3" / 57 mm)	K	M	D	I	3	C	I	R	**2**	**3**	A	7	–EQ
Motor length **A** = single stack **B** = double stack **C** = triple stack **D** = quad stack *(1)*	K	M	D	I	3	C	I	R	2	3	**A**	7	–EQ
Drive voltage **7** = +12 to +75 VDC *(2)* **6** = +12 to +60 VDC *(1)*	K	M	D	I	3	C	I	R	2	3	A	**7**	–EQ
Option Leave blank if unwanted **–EQ** = 512-line differential magnetic encoder with index mark, internal to the product	K	M	D	I	3	C	I	R	2	3	A	7	**–EQ**

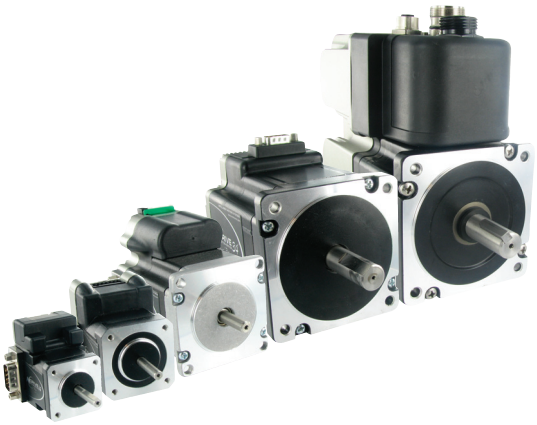
(1) Quad stack motors have +12 to +60 VDC drives.

(2) Single, double and triple stack motors have +12 to +75 VDC drives.

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® Plus
CANopen

MDrive® Plus
CANopen



MDrive®Plus CANopen

Presentation

The MDrive® Plus with CANopen interface is a 1.8° 2-phase stepper motor with on-board controller, drive electronics and optional encoder.

IMS CANopen firmware is provided for MDrive Plus CANopen products, in addition to CANopen Tester GUI software for interface with the MD-CC500-000 CANopen dongle.

MDrive Plus CANopen products support CiA DS301 and DSP402 Device Profile for Drives and Motion Control.

Application areas

The MDrive Plus with CANopen interface is ideal for machine builders who want an optimized motor with on-board electronics. The integrated electronics of the MDrive Plus with CANopen interface reduces the potential for problems due to electrical noise by eliminating the cable between motor and drive.

These compact, powerful and cost effective motion control solutions deliver unsurpassed smoothness and performance that will reduce system cost, design and assembly time for a large range of 2-phase stepper motor applications.

Features

- Highly integrated microstepping drive and high torque 1.8° 2-phase stepper motor
- Advanced current control for exceptional performance and smoothness
- Single supply: from +12 up to +75 VDC or 120 and 240 VAC
- Cost effective
- Extremely compact
- 20 microstep resolutions to 51,200 steps/rev including: Degrees, Metric, Arc Minutes
- Auxiliary logic power supply input
- Open or optional closed loop control
- Programmable motor run and hold currents
- Four +5 to +24 VDC I/O lines accept sinking outputs, or sinking and sourcing inputs
- One 10 bit analog input selectable: 0 to +10 VDC, 0 to +5 VDC, 0-20 mA, 4-20 mA
- 0 to 5 MHz step clock rate selectable in 0.59 Hz increments
- CANopen communication
- Available options:
  – Long life linear actuators *(1)*
  – Hybrid Motion Technology™ *(1)*
  – Encoders
  – Control knob for manual positioning
  – Industrial connectors with IP54 rating *(2)*
- Several motor stack lengths available
- Graphical user interface provided for quick and easy configuration and programming via optional MD-CC500-000 Communication Converter

Expanded Plus²

- +24 VDC tolerant I/O sourcing or sinking, inputs and outputs with up to 8 I/O lines and electronic gearing
- Closed loop control available with external / remote encoder option *(3)*
- High speed position capture input or trip output

(1) See separate documentation.
(2) Industrial connectors are unavailable for MDrive14 or MDrive34 products.
(3) Remote encoder interface unavailable on MDrive14 or MDrive34ac products

Standard Plus specifications

			MDrive 14 *(1)*	MDrive 17	MDrive 23 *(2)*	MDrive 23 *(2)*	MDrive 34 *(1)*	MDrive 34ac *(1)*	
Input power	Voltage	VDC	12 to 48	12 to 48	12 to 75	12 to 60	12 to 75	—	—
		VAC	—	—	—	—	—	120	240
	Current maximum *(3)*		1A	2A	2A	3.5A	4A	95 to 132 VAC @ 50/60 Hz	95 to 264 VAC @ 50/60 Hz
Thermal	Operating temp non-condensing	Heat sink	–40° to +85°C				–40° to +75°C		
		Motor	–40° to +100°C				–40° to +90°C		
Protection	Type		not applicable					- Thermal - Over voltage / current	

Aux. logic input voltage	Range	+12 to +24 VDC *When input voltage is removed, maintains power only to control and feedback circuits.*	
Analog input	Resolution	10 bit	
	Voltage range	0 to +5 VDC, 0 to +10 VDC, 0-20 mA, 4-20 mA	
General purpose I/O	Number	4	
	Type	sourcing or sinking inputs, or sinking outputs	
	Logic range	Inputs and outputs tolerant to +24 VDC, inputs TTL level compatible	
	Output sink current	Up to 600 mA	
	Protection	Over temp, short circuit, transient over voltage, inductive clamp	
Communication	Type	CANopen CiA DS301 (V3.0), DSP402 (V2.0), 2.0B active	
	Baud rate	Configurable 5 KB to 1 Mb	
	ID	11 and / or 29 bit	
	Isolation	Galvanic	
	Features	Node guarding, heartbeat, SDOs, PDOs (variable mapping)	
Motion	Open loop configuration	Number of settings	20
		Steps per revolution	200, 400, 800, 1000, 1600, 2000, 3200, 5000, 6400, 10000, 12800, 20000, 25000, 25600, 40000, 50000, 51200, 36000 (0.01 deg/µstep), 21600 (1 arc minute/µstep), 25400 (0.001mm/µstep)
	Counters	Type	position, encoder / 32 bit
		Edge rate maximum	5 MHz
	Velocity	Range	+/- 5,000,000 steps per second
		Resolution	0.5961 steps per second
	Accel / Decel	Range	1.5 x 10^9 steps per $second^2$
		Resolution	90.9 steps per $second^2$
Software	Setup parameters	Storable to nonvolatile memory	
	Transmit PDOs	3 dynamically mappable	
	Receive PDOs	3 dynamically mappable	
	Manufacturer specific objects	I/O configuration, run / hold current	
	Modes of operation	Profile position, homing mode, profile velocity	
	Input functions	General purpose, homing mode profiles	
	Output functions	General purpose	

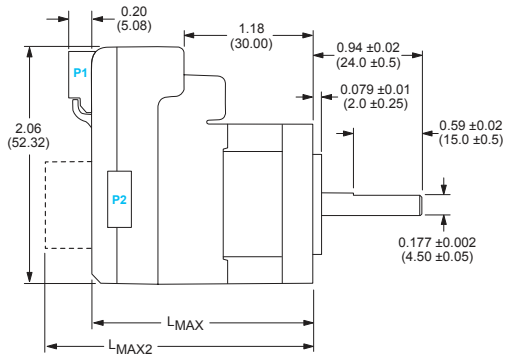
Expanded Plus² specifications

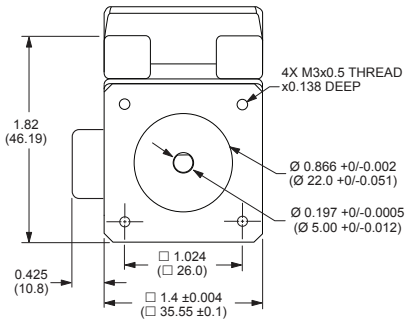
General purpose I/O	Number	8 (or 4 when remote encoder option is selected) *(5)*		
	Type	sourcing or sinking outputs / inputs		
	Logic range	Sourcing outputs +12 to +24 VDC, inputs and sinking outputs tolerant to +24 VDC, inputs TTL level compatible		
	Output sinking current	Up to 600 mA		
Motion	Electronic gearing	Range / resolution/ threshold – external clock in *(4)*		0.001 to 2.000 / 32 bit / TTL
		Input filter range		50 nS to 12.9 µS (10 MHz to 38.8 kHz)
		Range – secondary clock out *(4)*		1 to 1
	High speed I/O	Position capture	Input filter range	50 nS to 12.9 µS (10 MHz to 38.8 kHz)
			Resolution	32 bit
		Trip output – speed / resolution / threshold		150 nS / 32 bit / TTL

(1) CANopen available only with Plus² versions of MDrive14, MDrive34 and MDrive34ac products.
(2) Only quad stack NEMA 23 motors have +12 to +60 VDC drives, all other NEMA 23 motors have +12 to +75 VDC drives.
(3) Actual power supply current will depend on voltage and load.
(4) Adjusting the microstep resolution can increase the range.
(5) Remote encoder interface unavailable on MDrive14 or MDrive34ac products

See User Manual for complete details: www.motion.schneider-electric.com/manuals.html

– Plus² – mechanical specifications, dimensions in inches (mm)



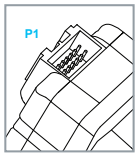


Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	1.93 (49.02)	2.62 (66.55)
Triple	3.03 (76.96)	3.73 (94.74)

(1) Single shaft or internal encoder.
(2) Control knob.

P1 connector

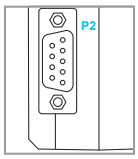
I/O & Power, Remote Encoder



16-pin locking wire crimp connector

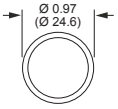
P2 connector

Communication



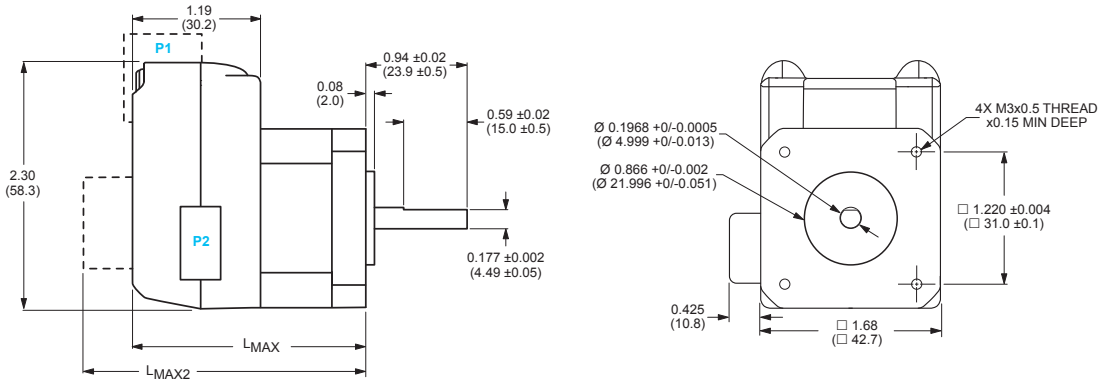
DB9 (male)

Lmax2 option



control knob

– Plus & Plus² – mechanical specifications, dimensions in inches (mm)

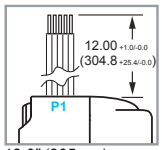


Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	2.20 (55.9)	2.79 (70.9)
Double	2.43 (61.7)	3.02 (76.7)
Triple	2.77 (70.4)	3.37 (85.6)

(1) Single shaft or internal encoder.
(2) Control knob or external encoder.

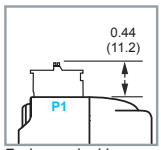
P1 connector options

I/O & Power



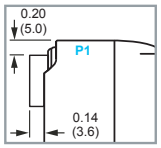
12.0" (305mm) flying leads

I/O & Power



7-pin non-locking spring clamp terminal strip

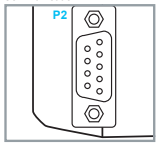
only for Plus² I/O & Power, Remote Encoder



16-pin locking wire crimp connector

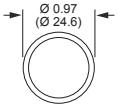
P2 connector

Communication



DB9 (male)

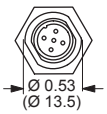
Lmax2 option



control knob

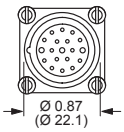
– Plus² with industrial connectors – mechanical specifications, dimensions in inches (mm)

Communication

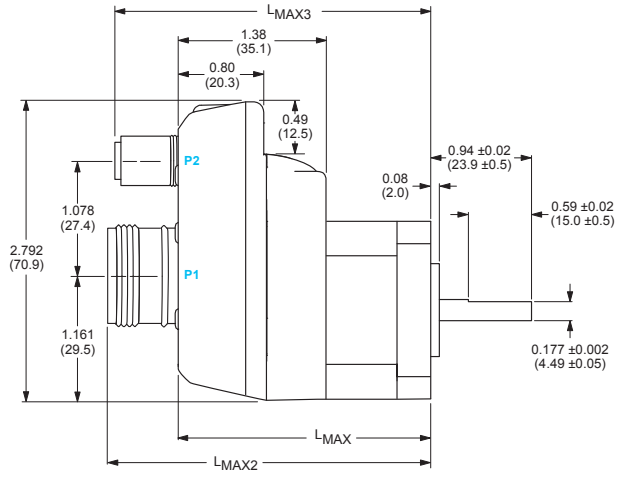


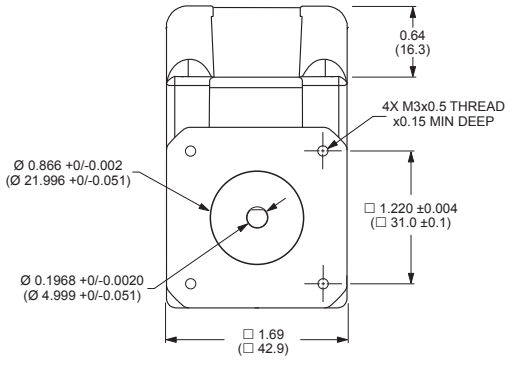
P2: 5-pin M12 (male) industrial connector

I/O & Power, Remote Encoder



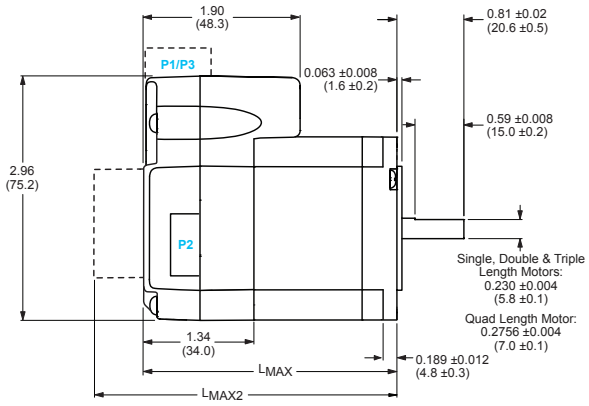
P1: 19-pin M23 (male) industrial connector

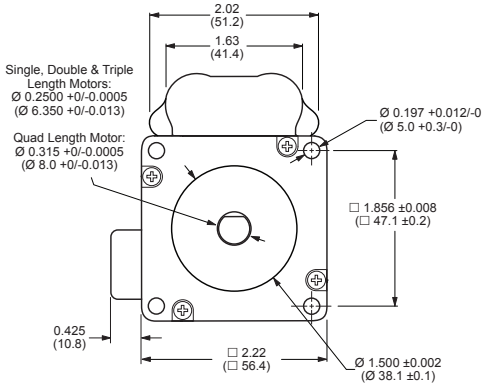




Motor stack length	Lmax	Lmax2	Lmax3
Single	2.48 (62.71)	3.15 (79.72)	3.08 (77.95)
Double	2.71 (68.55)	3.38 (85.57)	3.31 (83.79)
Triple	3.05 (77.18)	3.72 (94.20)	3.65 (92.42)

– Plus & Plus² – mechanical specifications, dimensions in inches (mm)

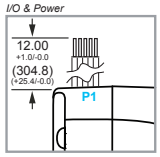




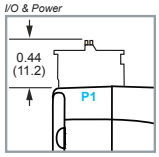
Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	2.65 (67.31)	3.36 (85.34)
Double	3.02 (76.71)	3.73 (94.74)
Triple	3.88 (98.55)	4.59 (116.59)
Quad	5.28 (134.15)	5.99 (152.19)

(1) Single shaft or internal encoder.
(2) Control knob or external encoder.

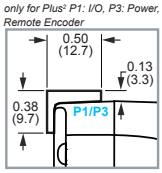
P1 connector options



12.0" (305mm) flying leads

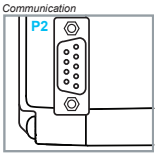


7-pin non-locking spring clamp terminal strip



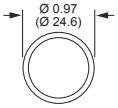
14- & 2-pin locking wire crimp connectors

P2 connector



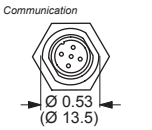
DB9 (male)

Lmax2 option

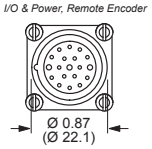


control knob

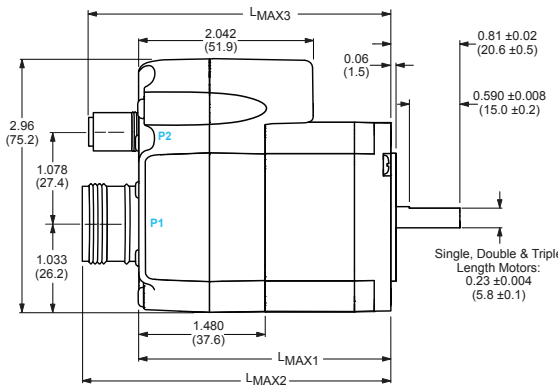
– Plus² with industrial connectors – mechanical specifications, dimensions in inches (mm)

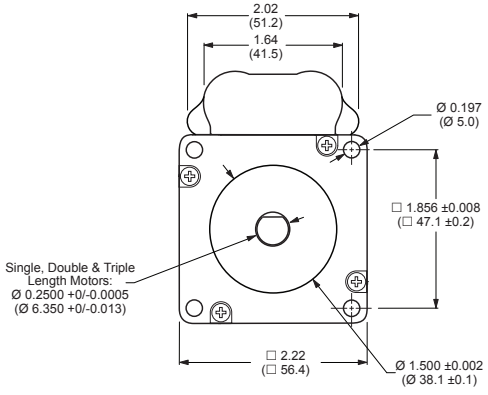


P2: 5-pin M12 (male) industrial connector



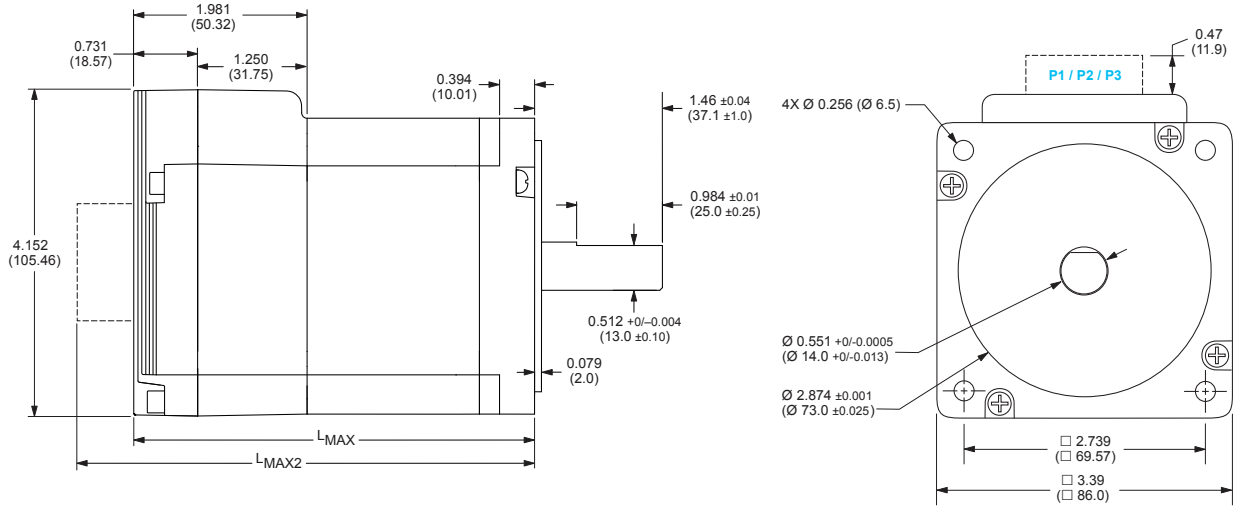
P1: 19-pin M23 (male) industrial connector





Motor stack length	Lmax	Lmax2	Lmax3
Single	2.91 (73.63)	3.57 (90.39)	3.51 (88.87)
Double	3.25 (82.26)	3.91 (99.03)	3.85 (97.5)
Triple	4.11 (104.11)	4.76 (120.62)	4.71 (119.35)

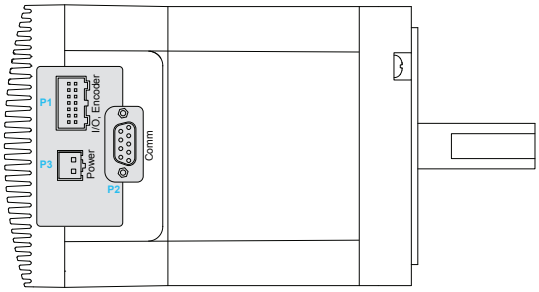
– Plus² – mechanical specifications, dimensions in inches (mm)



Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	3.81 (96.77)	4.52 (114.81)
Double	4.60 (116.84)	5.31 (134.87)
Triple	6.17 (156.72)	6.88 (174.75)

(1) Single shaft or internal encoder.
(2) Control knob.

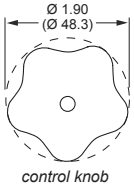
Connectors



Pluggable interface version:
14-pin and 2-pin locking wire crimp and*
DB9 male connectors

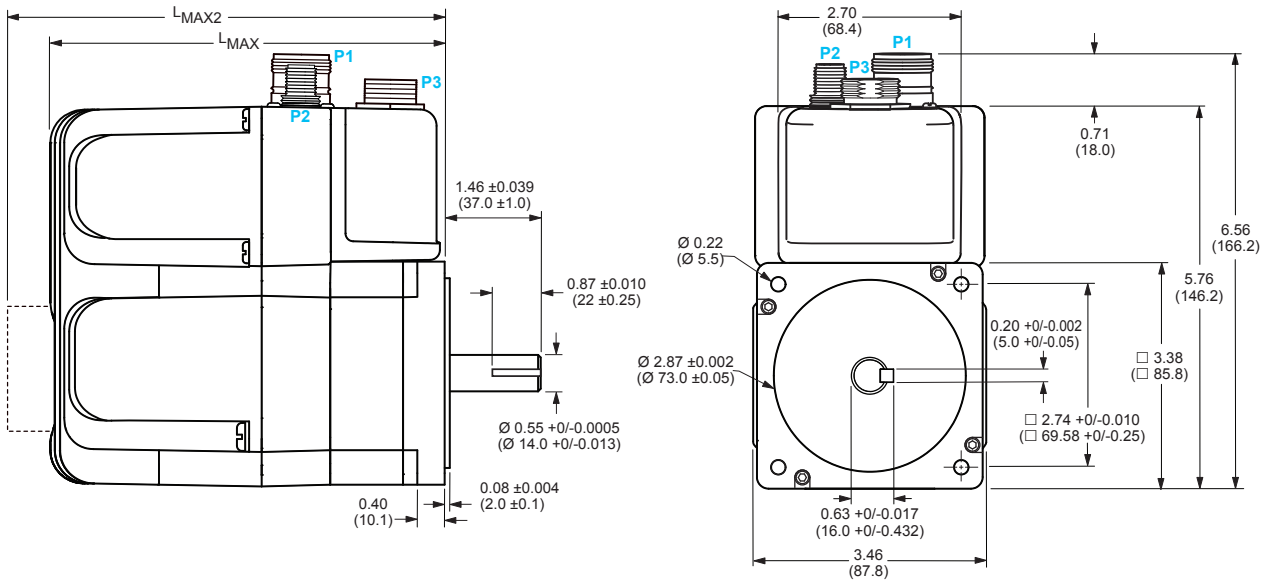
** 14-pin replaced by 20-pin locking wire crimp connector when optional remote encoder is included*

Lmax2 option



control knob

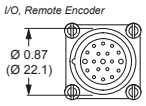
– Plus² with industrial connectors — mechanical specifications, dimensions in inches (mm)



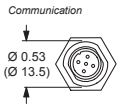
Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	6.1 (155.0)	7.1 (180.4)
Double	6.9 (174.3)	7.9 (199.7)
Triple	8.4 (214.3)	9.4 (239.7)

(1) Single shaft or internal encoder.
(2) Control knob.

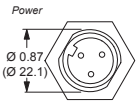
Connectors



P1: 19-pin M23 (male) industrial connector

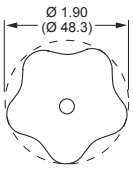


P2: 5-pin M12 (male) industrial connector



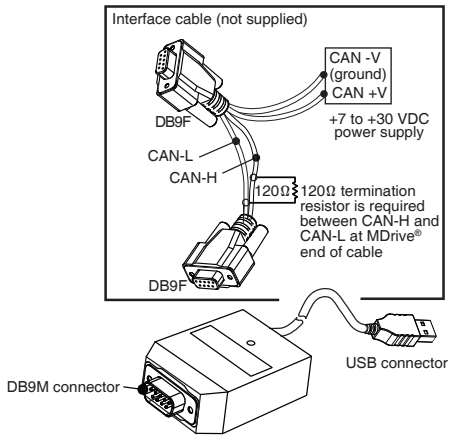
P3: 3-pin Euro AC (male) industrial connector

Lmax2 option

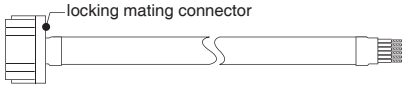


control knob

MDrive® 14 Plus
CANopen



MD-CC500-000



PD16-1417-FL3

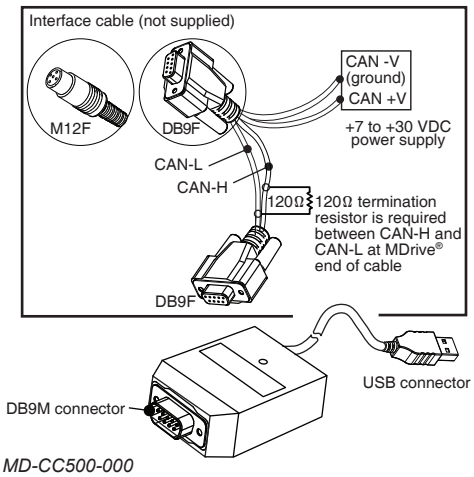
Installation accessories

Description	Length feet (m)	Part number
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to DB9 connector *(1)*	12.0 (3.6)	**MD-CC500-000**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 16-pin locking wire crimp connector for I/O, power and remote encoder option	10.0 (3.0)	**PD16-1417-FL3**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 16-pin locking wire crimp connector for I/O, power and remote encoder option	—	**CK-10**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive14 CANopen products	—	**DPM75**

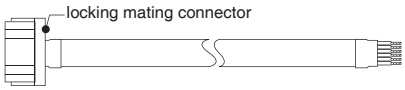
(1) Requires mating connector adapter and power supply, not supplied.

Connectivity details: www.motion.schneider-electric.com/connect.html

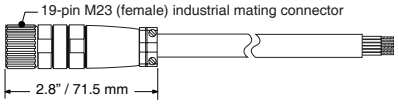
MDrive® 17 Plus
CANopen



MD-CC500-000



PD16-1417-FL3



MD-CS100-000

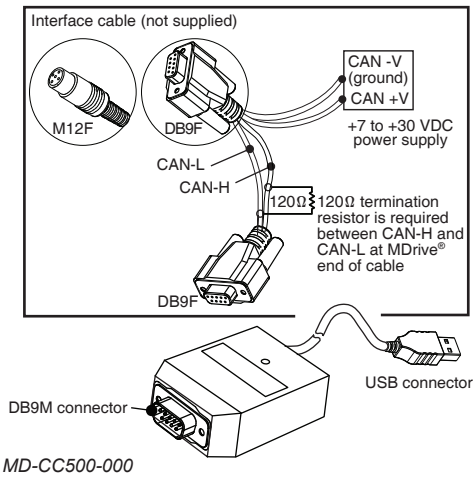
Installation accessories

Description	Length feet (m)	Part number
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to DB9 connector *(1)*	12.0 (3.6)	**MD-CC500-000**
■ Mates to 5-pin male M12 industrial connector *(1)*	12.0 (3.6)	**MD-CC500-000**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 16-pin locking wire crimp connector for I/O, power and remote encoder option	10.0 (3.0)	**PD16-1417-FL3**
■ Mates to 19-pin male M23 industrial connector with straight termination for I/O, power and remote encoder option	13.0 (4.0)	**MD-CS100-000**
■ Mates to 19-pin male M23 industrial connector with right angle termination for I/O, power and remote encoder option	13.0 (4.0)	**MD-CS101-000**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 16-pin locking wire crimp connector for I/O, power and remote encoder option	—	**CK-10**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive17 CANopen products	—	**DPM75**

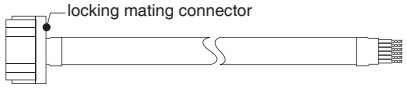
(1) Requires mating connector adapter and power supply, not supplied.

Connectivity details: www.motion.schneider-electric.com/connect.html

MDrive® 23 Plus
CANopen

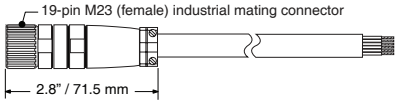


MD-CC500-000



PD16-1417-FL3

PD02-2300-FL3



MD-CS100-000

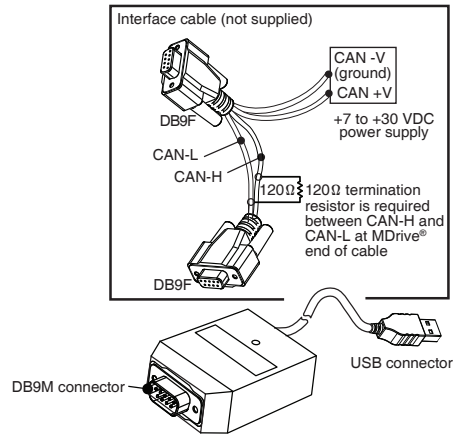
Installation accessories

Description	Length feet (m)	Part number
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to DB9 connector *(1)*	12.0 (3.6)	**MD-CC500-000**
■ Mates to 5-pin male M12 industrial connector *(1)*	12.0 (3.6)	**MD-CC500-000**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 14-pin locking wire crimp connector for I/O and remote encoder option	10.0 (3.0)	**PD14-2334-FL3**
■ Mates to 2-pin locking wire crimp connector for power	10.0 (3.0)	**PD02-2300-FL3**
■ Mates to 19-pin male M23 industrial connector with straight termination for I/O, power and remote encoder option	13.0 (4.0)	**MD-CS100-000**
■ Mates to 19-pin male M23 industrial connector with right angle termination for I/O, power and remote encoder option	13.0 (4.0)	**MD-CS101-000**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 14-pin locking wire crimp connector for I/O and remote encoder option	—	**CK-09**
■ 2-pin locking wire crimp connector for power	—	**CK-04**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive23 CANopen products	—	**DPM75**

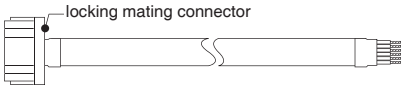
(1) Requires mating connector adapter and power supply, not supplied.

Connectivity details: www.motion.schneider-electric.com/connect.html

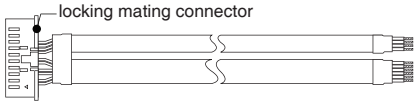
MDrive® 34 Plus
CANopen



MD-CC500-000



PD14-2334-FL3



PD20-3400-FL3

PD02-3400-FL3

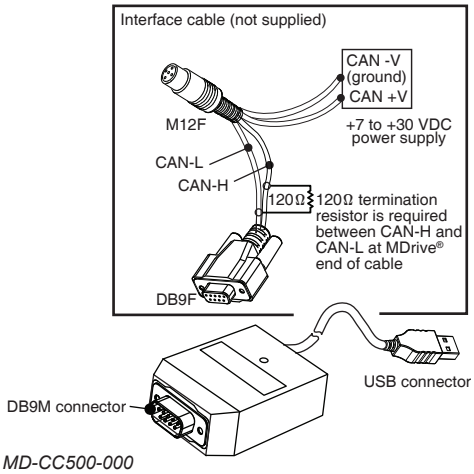
Installation accessories

Description	Length feet (m)	Part number
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to DB9 connector *(1)*	12.0 (3.6)	**MD-CC500-000**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 14-pin locking wire crimp connector for I/O and optional internal encoder	10.0 (3.0)	**PD14-2334-FL3**
■ Mates to 20-pin locking wire crimp connector for I/O and remote encoder option	10.0 (3.0)	**PD20-3400-FL3**
■ Mates to 2-pin locking wire crimp connector for power	10.0 (3.0)	**PD02-3400-FL3**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 14-pin locking wire crimp connector for I/O and optional internal encoder	—	**CK-09**
■ 20-pin locking wire crimp connector for I/O and remote encoder option	—	**CK-11**
■ 2-pin locking wire crimp connector for power	—	**CK-05**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive34 CANopen products	—	**DPM75**

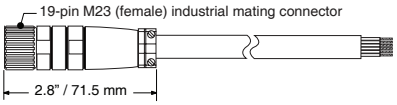
(1) Requires mating connector adapter and power supply, not supplied.

Connectivity details: www.motion.schneider-electric.com/connect.html

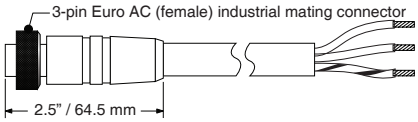
MDrive® 34 ac Plus
CANopen



MD-CC500-000



MD-CS100-000



MD-CS200-000

Installation accessories

Description	Length feet (m)	Part number
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 5-pin male M12 industrial connector *(1)*	12.0 (3.6)	**MD-CC500-000**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 19-pin male M23 industrial connector with straight termination for I/O and remote encoder option	13.0 (4.0)	**MD-CS100-000**
■ Mates to 19-pin male M23 industrial connector with right angle termination for I/O and remote encoder option	13.0 (4.0)	**MD-CS101-000**
■ Mates to 3-pin male Euro AC industrial connector with straight termination for power	13.0 (4.0)	**MD-CS200-000**
■ Mates to 3-pin male Euro AC industrial connector with right angle termination for power	13.0 (4.0)	**MD-CS201-000**

(1) Requires mating connector adapter and power supply, not supplied.

Connectivity details: www.motion.schneider-electric.com/connect.html

MDrive® 14 Plus
CANopen

MDrive® 14 Plus²

P1: I/O & Power, and optional remote encoder
C = 16-pin locking wire crimp connector

P2: Communication
B = CANopen with DB9 male connector

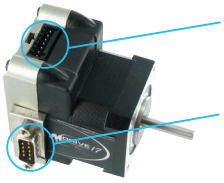
Part numbers

Example:	M	D	I	3	C	C	B	1	4	A	4	–EQ
MDrive Plus version **MDI** = CANopen	**M**	**D**	**I**	3	C	C	B	1	4	A	4	–EQ
Input **3** = Plus², expanded features	M	D	I	**3**	C	C	B	1	4	A	4	–EQ
P1 connector **C** = wire crimp	M	D	I	3	**C**	C	B	1	4	A	4	–EQ
Communication **C** = CANopen	M	D	I	3	C	**C**	B	1	4	A	4	–EQ
P2 connector **B** = DB9	M	D	I	3	C	C	**B**	1	4	A	4	–EQ
Motor size **14** = NEMA 14 (1.4" / 36 mm)	M	D	I	3	C	C	B	**1**	**4**	A	4	–EQ
Motor length **A** = single stack **C** = triple stack	M	D	I	3	C	C	B	1	4	**A**	4	–EQ
Drive voltage **4** = +12 to +48 VDC	M	D	I	3	C	C	B	1	4	A	**4**	–EQ
Options Leave blank if not wanted Options may be combined, unless noted **–EQ** = internal encoder, 512-line internal magnetic encoder with index mark **–N** = rear control knob for manual positioning												**–EQ**

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 17 Plus
CANopen

MDrive® 17 Plus



P1: I/O & Power
F = 12" flying leads
P = non-locking spring clamp terminal strip

P2: Communication
B = CANopen with DB9 male connector

MDrive® 17 Plus²

P1: I/O & Power, and optional remote encoder
C = 16-pin locking wire crimp connector

P2: Communication
B = CANopen with DB9 male connector

MDrive® 17 Plus²
with industrial connectors

P2: Communication
Q = CANopen with 5-pin M12 male industrial connector

P1: I/O & Power, and optional remote encoder
M = 19-pin M23 male industrial connector

Part numbers

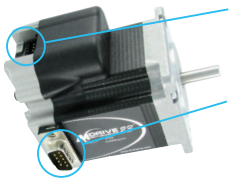
Example:	M	D	I	1	F	C	B	1	7	A	4	–EQ
MDrive Plus version **MDI** = CANopen	**M**	**D**	**I**	1	F	C	B	1	7	A	4	–EQ
Input **1** = Plus, standard features **3** = Plus², expanded features **4** = Plus², expanded features, with industrial connectors, IP54-rated	M	D	I	**1**	F	C	B	1	7	A	4	–EQ
P1 connector **F** = flying leads **P** = pluggable **C** = wire crimp *(1)* **M** = M23 industrial connector *(2)*	M	D	I	1	**F**	C	B	1	7	A	4	–EQ
Communication **C** = CANopen	M	D	I	1	F	**C**	B	1	7	A	4	–EQ
P2 connector **B** = DB9 **Q** = M12 industrial connector *(2)*	M	D	I	1	F	C	**B**	1	7	A	4	–EQ
Motor size **17** = NEMA 17 (1.7" / 42 mm)	M	D	I	1	F	C	B	**1**	**7**	A	4	–EQ
Motor length **A** = single stack **B** = double stack **C** = triple stack	M	D	I	1	F	C	B	1	7	**A**	4	–EQ
Drive voltage **4** = +12 to +48 VDC	M	D	I	1	F	C	B	1	7	A	**4**	–EQ
Options Leave blank if not wanted Options may be combined, unless noted												**–EQ**
–EQ = internal encoder, 512-line internal magnetic encoder with index mark												
–EE = remote encoder interface, differential encoder to be provided by user *Available with Plus² versions only. May not be combined with internal encoder option.*												
–N = rear control knob for manual positioning *(3)*												

(1) Only available with Plus² products without industrial connectors.
(2) Only available with Plus² products with industrial connectors.
(3) Not available with industrial connector products.

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 23 Plus
CANopen

MDrive® 23 Plus



P1: I/O & Power
F = 12" flying leads
P = non-locking spring clamp terminal strip

P2: Communication
B = CANopen with DB9 male connector

MDrive® 23 Plus²

P1: I/O, and optional remote encoder
C = 14-pin locking wire crimp connector

P3: Power
2-pin locking wire crimp connector

P2: Communication
B = CANopen with DB9 male connector

MDrive® 23 Plus²
with industrial connectors

P2: Communication
Q = CANopen with 5-pin M12 male industrial connector

P1: I/O & Power, and optional remote encoder
M = 19-pin M23 male industrial connector

Part numbers

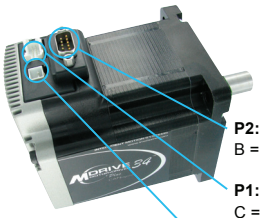
Example:	M	D	I	1	F	C	B	2	3	A	7	–EQ
MDrive Plus version **MDI** = CANopen	**M**	**D**	**I**	1	F	C	B	2	3	A	7	–EQ
Input **1** = Plus, standard features **3** = Plus², expanded features **4** = Plus², expanded features with industrial connectors, IP54-rated	M	D	I	**1**	F	C	B	2	3	A	7	–EQ
P1 connector **F** = flying leads **P** = pluggable **C** = wire crimp *(1)* **M** = M23 industrial connector *(2)*	M	D	I	1	**F**	C	B	2	3	A	7	–EQ
Communication **C** = CANopen	M	D	I	1	F	**C**	B	2	3	A	7	–EQ
P2 connector **B** = DB9 **Q** = M12 industrial connector *(2)*	M	D	I	1	F	C	**B**	2	3	A	7	–EQ
Motor size **23** = NEMA 23 (2.3" / 57 mm)	M	D	I	1	F	C	B	**2**	**3**	A	7	–EQ
Motor length *(3)* **A** = single stack **B** = double stack **C** = triple stack **D** = quad stack	M	D	I	1	F	C	B	2	3	**A**	7	–EQ
Drive voltage *(3)* **7** = +12 to +75 VDC **6** = +12 to +60 VDC	M	D	I	1	F	C	B	2	3	A	**7**	–EQ
Options Leave blank if not wanted Options may be combined, unless noted **–EQ** = internal encoder, 512-line internal optical encoder with index mark **–EE** = remote encoder interface, differential encoder to be provided by user *Available with Plus² versions only. May not be combined with internal encoder option.* **–N** = rear control knob for manual positioning *(4)*												**–EQ**

(1) Only available with Plus² products without industrial connectors.
(2) Only available with Plus² products with industrial connectors.
(3) Only quad stack motors have +12 to +60 VDC drives, all other motors have +12 to +75 VDC drives.
(4) Not available with industrial connector products.

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 34 Plus
CANopen

MDrive® 34 Plus²
pluggable interface



P2: Communication
B = CANopen with DB9 male connector

P1: I/O, and optional remote encoder
C = 14-pin locking wire crimp connector
(20-pin with remote encoder option)

P3: Power
2-pin locking wire crimp connector

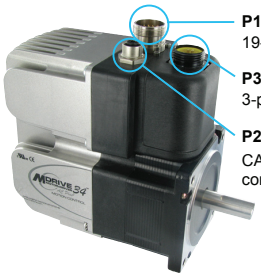
Part numbers

Example:	M	D	I	3	C	C	B	3	4	A	7	–EQ
MDrive Plus version **MDI** = CANopen	**M**	**D**	**I**	3	C	C	B	3	4	A	7	–EQ
Input **3** = Plus², expanded features	M	D	I	**3**	C	C	B	3	4	A	7	–EQ
P1 connector **C** = pluggable	M	D	I	3	**C**	C	B	3	4	A	7	–EQ
Communication **C** = CANopen	M	D	I	3	C	**C**	B	3	4	A	7	–EQ
P2 connector **B** = DB9	M	D	I	3	C	C	**B**	3	4	A	7	–EQ
Motor size **34** = NEMA 34 (3.4" / 86 mm)	M	D	I	3	C	C	B	**3**	**4**	A	7	–EQ
Motor length **A** = single stack **B** = double stack **C** = triple stack	M	D	I	3	C	C	B	3	4	**A**	7	–EQ
Drive voltage **7** = +12 to +75 VDC	M	D	I	3	C	C	B	3	4	A	**7**	–EQ
Options Leave blank if not wanted Options may be combined, unless noted **–EQ** = internal encoder, 512-line internal optical encoder with index mark **–EE** = remote encoder interface, differential encoder to be provided by user *May not be combined with internal encoder option.* **–N** = rear control knob for manual positioning												**–EQ**

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 34 ac Plus
CANopen

MDrive® 34ac Plus²



P1: I/O, and optional remote encoder
19-pin M23 male industrial connector

P3: Integrated Power Supply
3-pin Euro AC male industrial connector

P2: Communication
CANopen with 5-pin M12 male industrial connector

Part numbers

Example:	M	D	I	4	M	C	Q	3	4	A	1	–EQ
MDrive Plus version **MDI** = CANopen	**M**	**D**	**I**	4	M	C	Q	3	4	A	1	–EQ
Input **4** = Plus², expanded features with industrial connectors, IP54-rated	M	D	I	**4**	M	C	Q	3	4	A	1	–EQ
P1 connector **M** = M23 industrial connector	M	D	I	4	**M**	C	Q	3	4	A	1	–EQ
Communication **C** = CANopen	M	D	I	4	M	**C**	Q	3	4	A	1	–EQ
P2 connector **Q** = M12 industrial connector	M	D	I	4	M	C	**Q**	3	4	A	1	–EQ
Motor size **34** = NEMA 34 (3.4" / 86 mm)	M	D	I	4	M	C	Q	**3**	**4**	A	1	–EQ
Motor length **A** = single stack **B** = double stack **C** = triple stack	M	D	I	4	M	C	Q	3	4	**A**	1	–EQ
Drive voltage **1** = 120 VAC **2** = 240 VAC	M	D	I	4	M	C	Q	3	4	A	**1**	–EQ
Options Leave blank if not wanted Options may be combined, unless noted **–EQ** = internal encoder, 512-line internal magnetic encoder with index mark **–N** = rear control knob for manual positioning *(1)*												**–EQ**

(1) Not IP54-rated.

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® Plus
Speed Control

MDrive® Plus
Speed Control
with programmable velocity control

MDrive®Plus Speed Control with programmable velocity control

Presentation

The MDrive® Plus Speed Control with programmable velocity control is a 1.8° 2-phase stepper motor with on-board control electronics. The velocity control uses voltage, current, or PWM analog input signal modes.

Settings for MDrive Plus Speed Control products may be changed on-the-fly or downloaded and stored in nonvolatile memory using the IMS SPI Motor Interface software provided. This eliminates the need for external switches or resistors. Parameters are changed via an SPI port.

Application areas

The MDrive Plus Speed Control with programmable velocity control is ideal for machine builders who want an optimized motor with on-board electronics. The integrated electronics of the MDrive Plus Speed Control with programmable velocity control reduces the potential for problems due to electrical noise by eliminating the cable between motor and drive.

These compact, powerful and cost effective motion control solutions deliver unsurpassed smoothness and performance that will reduce system cost, design and assembly time for a large range of 2-phase stepper motor applications.

Features

- Highly integrated microstepping drive and high torque 1.8° 2-phase stepper motor
- Advanced current control for exceptional performance and smoothness
- Single supply: from +12 up to +75 VDC
- Cost effective
- Extremely compact
- 20 microstep resolutions up to 51,200 steps per rev including: Degrees, Metric, Arc Minutes
- 10-bit analog speed control inputs accept:
  – 0 to +5 VDC
  – 0 to +10 VDC
  – 4 to 20 mA
  – 0 to 20 mA
  – 15 to 25 kHz PWM, only with MDrive34 products
- Automatic current reduction
- Electronically configurable:
  – Motor run / hold current
  – Microstep resolution
  – Acceleration / deceleration
  – Initial and maximum velocity
  – Hold current delay time / motor settling delay time
  – Programmable filtering for the stop / start input
- Available options:
  – Encoder
  – Control knob for manual positioning
- Several motor stack lengths available
- Setup parameters may be switched on-the-fly
- Numerous connector interface choices
- Graphical user interface provided for quick and easy parameter setup

MDrive® Plus
Speed Control
with programmable velocity control

Plus specifications

			MDrive 17	MDrive 23 *(1)*	MDrive 23 *(1)*	MDrive 34
Input power	Voltage	VDC	12 to 48	12 to 75	12 to 60	12 to 75
	Current maximum *(2)*		2A	2A	3.5A	4A
Thermal	Operating temp non-condensing	Heat sink	–40° to +85°C			–40° to +75°C
		Motor	–40° to +100°C			–40° to +90°C
Speed control	Input		0 to +5 VDC *(4)*, 0 to +10 VDC, 4 to 20 mA, 0 to 20 mA			Speeds A1 and A2: 0 to +5 VDC *(4)*, 0 to +10 VDC, 4 to 20 mA, 0 to 20 mA, 15 to 25 kHz PWM
	A/D resolution		10 bit			10 bit
Logic input	Low level		0 to +0.8 VDC			0 to +0.8 VDC
	High level		+2.0 to +5.0 VDC			+5.0 to +24.0 VDC
	Internal pull-up resistance		20 kΩ (to +3.3 VDC)			not applicable
	Optically isolated		no			yes
	Configurable		sinking			sourcing or sinking
Logic output	Step clock/direction	Open drain source maximum	not applicable			+100 VDC
		Open drain current continuous	not applicable			100 mA
		Output pulse width	not applicable			100 nSec to 12.8 µSec software configurable
Motion	Oscillator frequency maximum		5 MHz			
	Microstep resolution	Number of settings	20			
		Steps per revolution	200, 400, 800, 1000, 1600, 2000, 3200, 5000, 6400, 10000, 12800, 20000, 25000, 25600, 40000, 50000, 51200, 36000 (0.01 deg/µstep), 21600 (1 arc minute/µstep), 25400 (0.001mm/µstep)			

Setup parameters *(4)*

SPI communication	Function	Range	Units	Default
A1 *(5)*	Analog input mode	0 to +5 VDC, 0 to +10 VDC, 4 to 20 mA, 0 to 20 mA	—	0 to +5 VDC
ACCL	Acceleration	91 to 1.5 X 10^9	steps/sec^2	1,000,000
C *(7)*	Joystick center	1 to 1022	counts	0
CLK OUT *(6)*	Clock out	none, step/dir, quadrature, up/down	—	none
DB *(8)*	Analog deadband	0 to 255	counts	1
DECL	Deceleration	91 to 1.5 X 10^9	mSec	500
DIR	Motor direction override	Clockwise (cw)/counterclockwise (ccw)	—	cw
FAULT	Fault/checksum error	error code	—	none
FS *(8)*	Analog full scale	1 to 1023	counts	1023
HCDT	Hold current delay time	HCDT + MSDT <= 65535	milliseconds	500
IF *(8)*	Analog input filter	1 to 1000	counts	1
IMODE *(6)*	Source	A1 spd/A2 spd or PWM 15 to 25 kHz	—	A1&A2
	Analog input, A1&A2 spds	0 to +5 VDC, 0 to +10 VDC, 4 to 20 mA, 0 to 20 mA	volts or current	0 to +5 VDC
MHC	Motor hold current	0 to 100	percent	5
MRC	Motor run current	1 to 100	percent	25
MSDT	Motor settling delay time	MSDT + HCDT <= 65535	milliseconds	0
MSEL	Microstep resolution	1, 2, 4, 5, 8, 10, 16, 25, 32, 50, 64, 100, 108, 125, 127, 128, 180, 200, 250, 256	µsteps per full step	256
STEPW *(6)*	Step width	0 (square wave), 100 nSec to 12.8 µSec	nSec	550 nSec
SSD	Stop/start debounce	0 to 255	milliseconds	0
VI	Initial velocity	0 to <VM	steps/sec	1000
VM	Maximum velocity	VI to 5,000,000	steps/sec	768,000
TEMP *(6)*	Warning temperature	0 to 85°C	°C	80°C
USER ID	User ID	customizable	1-3 characters	IMS

(1) Only quad stack NEMA 23 motors have +12 to +60 VDC drives, all other NEMA 23 motors have +12 to +75 VDC drives.

(2) Adjusting the microstep resolution can increase the range.

(3) 10 kΩ potentiometer resistance.

(4) All parameters are set using the supplied SPI Motor Interface GUI and may be changed on-the-fly. An optional Communication Converter is recommended with first orders.

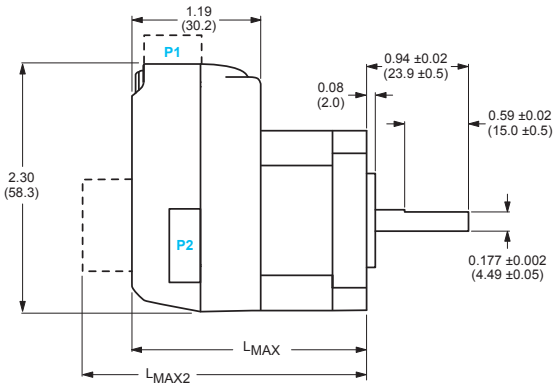
(5) Only with MDrive17 & MDrive23 products.

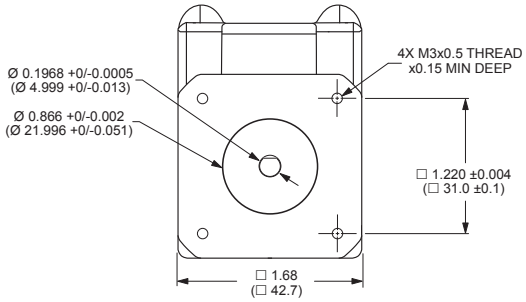
(6) Only with MDrive34 products.

(7) Separate analog inputs for A1 and A2 speeds with MDrive 34 products.

See User Manual for complete details: www.motion.schneider-electric.com/manuals.html

– Plus – mechanical specifications, dimensions in inches (mm)

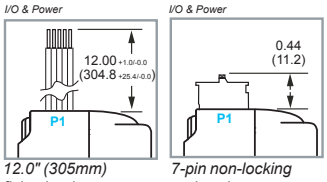




Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	2.20 (55.9)	2.79 (70.9)
Double	2.43 (61.7)	3.02 (76.7)
Triple	2.77 (70.4)	3.37 (85.6)

(1) Single shaft.
(2) Control knob or external encoder.

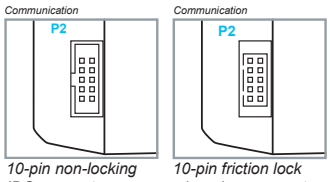
P1 connector options



12.0" (305mm) flying leads

7-pin non-locking spring clamp terminal strip

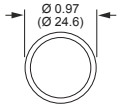
P2 connector options



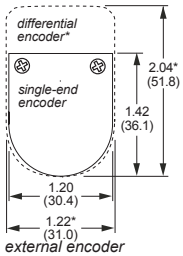
10-pin non-locking IDC connector

10-pin friction lock wire crimp connector

Lmax2 options

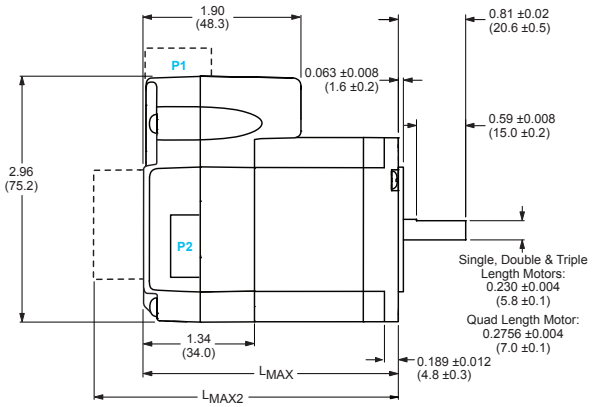


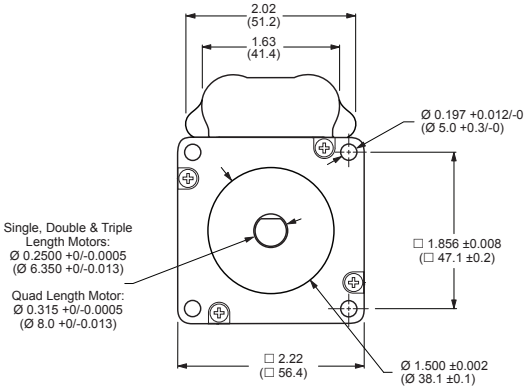
control knob



external encoder

– Plus – mechanical specifications, dimensions in inches (mm)

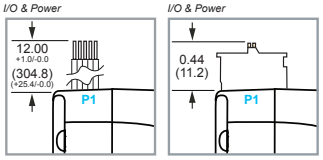




Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	2.65 (67.31)	3.36 (85.34)
Double	3.02 (76.71)	3.73 (94.74)
Triple	3.88 (98.55)	4.59 (116.59)
Quad	5.28 (134.15)	5.99 (152.19)

(1) Single shaft.
(2) Control knob or external encoder.

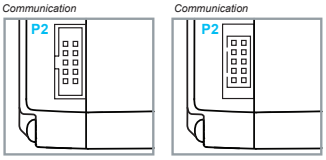
P1 connector options



12.0" (305mm) flying leads

7-pin non-locking spring clamp terminal strip

P2 connector options

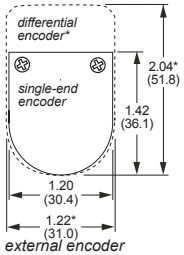


10-pin non-locking IDC connector

10-pin friction lock wire crimp connector

Lmax2 options

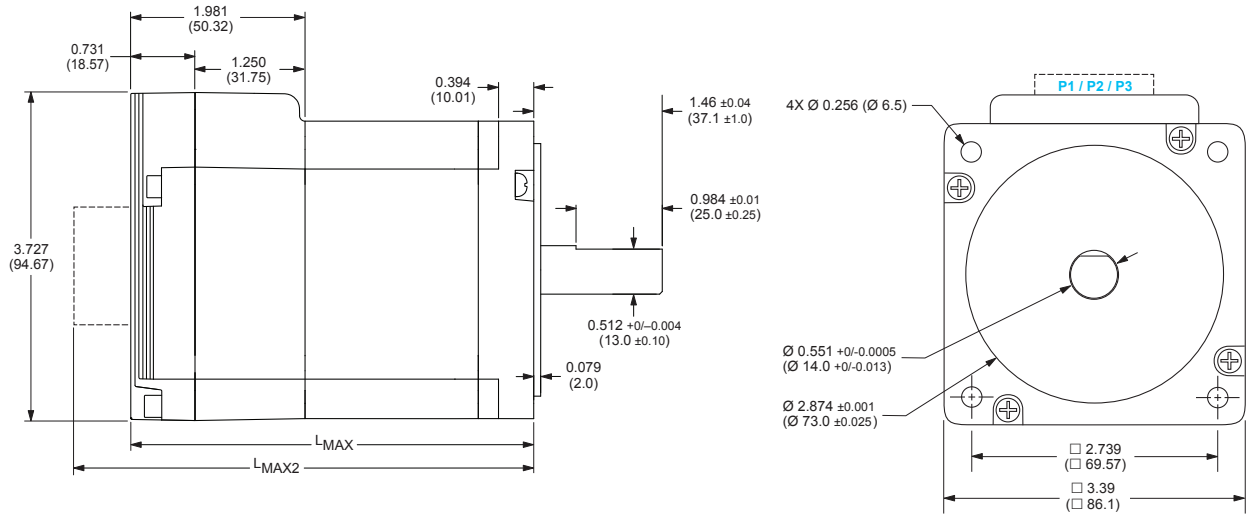
control knob



external encoder

MDrive® 34 Plus
Speed Control
with programmable velocity control

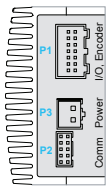
– Plus – mechanical specifications, dimensions in inches (mm)



Motor stack length	Lmax *(1)*	Lmax2 *(2)*
Single	3.81 (96.77)	4.52 (114.81)
Double	4.60 (116.84)	5.31 (134.87)
Triple	6.17 (156.72)	6.88 (174.75)

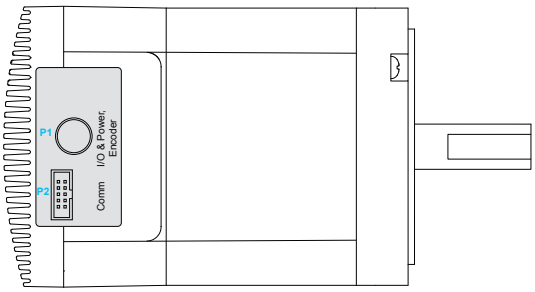
(1) Single shaft or internal encoder.
(2) Control knob.

Connector options



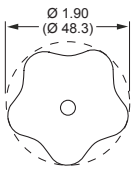
Pluggable interface version: 12-pin and 2-pin locking and 10-pin friction lock wire crimp connectors*

** 12-pin replaced by 20-pin locking wire crimp connector when optional internal encoder is included*



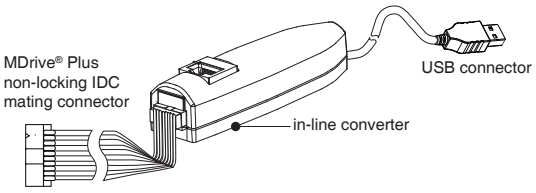
Flying leads interface version: 12" (305mm) flying leads with 10-pin non-locking IDC connector

Lmax2 option

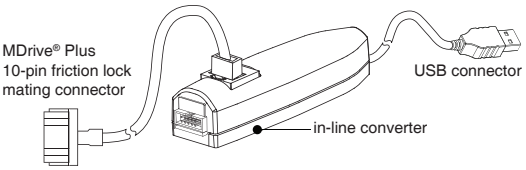


control knob

MDrive® 17 Plus
Speed Control
with programmable velocity control



MD-CC300-001



MD-CC302-001

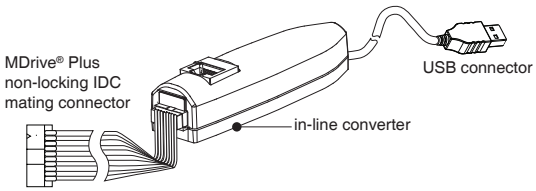
Installation accessories

Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrivePlus initial functional setup and system testing.		
■ For all MDrive17 Speed Control products.	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/ program communication parameters for a single MDrivePlus via a PC's USB port.		
■ Mates to 10-pin non-locking IDC connector	12.0 (3.6)	**MD-CC300-001**
■ Mates to 10-pin friction lock wire crimp connector	12.0 (3.6)	**MD-CC302-001**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 10-pin non-locking IDC connector for communication	—	**CK-01**
■ 10-pin friction lock wire crimp connector for communication	—	**CK-02**
Encoder cables		
Pre-wired mating connector with other cable end open.		
■ For external single-end encoder	1.0 (0.3)	**ES-CABLE-2**
■ For external differential encoder, locking cable	6.0 (1.8)	**ED-CABLE-6**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrivePlus.		
■ For all MDrive17 Speed Control products	—	**DPM75**

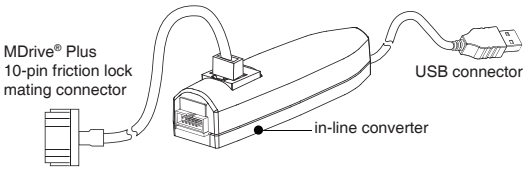
(1) See page 74.

Connectivity details: www.motion.schneider-electric.com/connect.html

MDrive® 23 Plus
Speed Control
with programmable velocity control



MD-CC300-001



MD-CC302-001

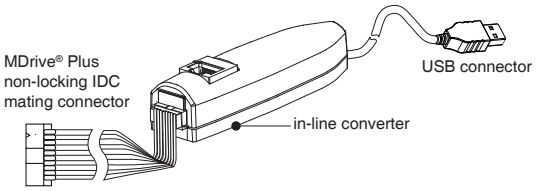
Installation accessories

Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For all MDrive23 Speed Control products.	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 10-pin non-locking IDC connector	12.0 (3.6)	**MD-CC300-001**
■ Mates to 10-pin friction lock wire crimp connector	12.0 (3.6)	**MD-CC302-001**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 10-pin non-locking IDC connector for communication	—	**CK-01**
■ 10-pin friction lock wire crimp connector for communication	—	**CK-02**
Encoder cables		
Pre-wired mating connector with other cable end open.		
■ For external single-end encoder	1.0 (0.3)	**ES-CABLE-2**
■ For external differential encoder, locking cable	6.0 (1.8)	**ED-CABLE-6**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive23 Speed Control products	—	**DPM75**

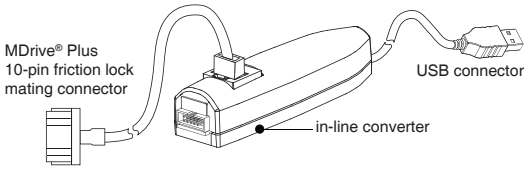
(1) See page 75.

Connectivity details: www.motion.schneider-electric.com/connect.html

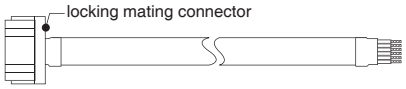
MDrive® 34 Plus
Speed Control
with programmable velocity control



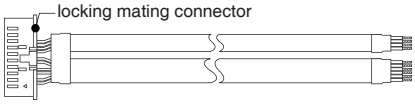
MD-CC300-001



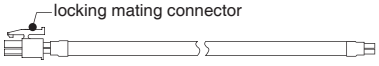
MD-CC302-001



PD12B-2334-FL3



PD20B-3400-FL3



PD02-3400-FL3

Installation accessories

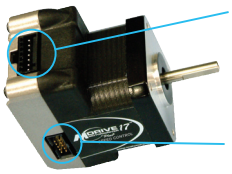
Description	Length feet (m)	Part number
QuickStart Kit		
For rapid design verification, all-inclusive QuickStart Kits include connectivity, instructions and CD for MDrive Plus initial functional setup and system testing.		
■ For all MDrive34 Speed Control products.	—	**add "K" to part number** *(1)*
Communication converter		
Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/program communication parameters for a single MDrive Plus via a PC's USB port.		
■ Mates to 10-pin non-locking IDC connector	12.0 (3.6)	**MD-CC300-001**
■ Mates to 10-pin friction lock wire crimp connector	12.0 (3.6)	**MD-CC302-001**
Prototype development cable		
Speed test/development with pre-wired mating connector with other cable end open.		
■ Mates to 12-pin locking wire crimp connector for I/O and optional internal encoder	10.0 (3.0)	**PD12B-2334-FL3**
■ Mates to 20-pin locking wire crimp connector for I/O and remote encoder option	10.0 (3.0)	**PD20B-3400-FL3**
■ Mates to 2-pin locking wire crimp connector for power	10.0 (3.0)	**PD02-3400-FL3**
Mating connector kit		
Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
■ 10-pin non-locking IDC connector for communication	—	**CK-01**
■ 10-pin friction lock wire crimp connector for communication	—	**CK-02**
■ 12-pin locking wire crimp connector for I/O and optional internal encoder	—	**CK-08**
■ 20-pin locking wire crimp connector for I/O and remote encoder option	—	**CK-11**
■ 2-pin locking wire crimp connector for power	—	**CK-05**
Drive protection module		
Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
■ For all MDrive34 Speed Control products	—	**DPM75**

(1) See page 76.

Connectivity details: www.motion.schneider-electric.com/connect.html

MDrive® 17 Plus
Speed Control
with programmable velocity control

MDrive® 17 Plus



P1: I/O & Power
F = 12" flying leads
P = non-locking spring clamp terminal strip

P2: Communication
D = SPI with 10-pin IDC non-locking connector
L = SPI with 10-pin friction lock wire crimp connector

Part numbers

Example:	K	M	D	O	1	F	S	D	1	7	A	4	–E1
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	O	1	F	S	D	1	7	A	4	–E1
MDrive Plus version **MDO** = Speed Control	K	**M**	**D**	**O**	1	F	S	D	1	7	A	4	–E1
Input **1** = Plus, standard features	K	M	D	O	**1**	F	S	D	1	7	A	4	–E1
P1 connector — I/O & power **F** = flying leads **P** = pluggable	K	M	D	O	1	**F**	S	D	1	7	A	4	–E1
Communication **S** = SPI	K	M	D	O	1	F	**S**	D	1	7	A	4	–E1
P2 connector — communication **D** = IDC **L** = wire crimp	K	M	D	O	1	F	S	**D**	1	7	A	4	–E1
Motor size **17** = NEMA 17 (1.7" / 42 mm)	K	M	D	O	1	F	S	D	**1**	**7**	A	4	–E1
Motor length **A** = single stack **B** = double stack **C** = triple stack	K	M	D	O	1	F	S	D	1	7	**A**	4	–E1
Drive voltage **4** = +12 to +48 VDC	K	M	D	O	1	F	S	D	1	7	A	**4**	–E1
Options Leave blank if not wanted Options may not be combined													**–E1**

–E___ = external optical encoder with index mark

line count	100	200	250	256	400	500	512	1000	1024
single-end part #	E1	E2	E3	EP	E4	E5	EQ	E6	ER
differential part #	EAL	EBL	ECL	EWL	EDL	EHL	EXL	EJL	EYL

–N = rear control knob for manual positioning

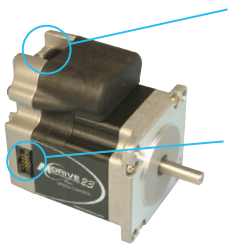
Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 23 Plus

Speed Control

with programmable velocity control

MDrive® 23 Plus



P1: I/O & Power
F = 12" flying leads
P = non-locking spring clamp terminal strip

P2: Communication
D = SPI with 10-pin IDC non-locking connector
L = SPI with 10-pin friction lock wire crimp connector

Part numbers

Example:	K	M	D	O	1	F	S	D	2	3	A	7	–E1
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	O	1	F	S	D	2	3	A	7	–E1
MDrive Plus version **MDO** = Speed Control	K	**M**	**D**	**O**	1	F	S	D	2	3	A	7	–E1
Input **1** = Plus, standard features	K	M	D	O	**1**	F	S	D	2	3	A	7	–E1
P1 connector — I/O & power **F** = flying leads **P** = pluggable	K	M	D	O	1	**F**	S	D	2	3	A	7	–E1
Communication **S** = SPI	K	M	D	O	1	F	**S**	D	2	3	A	7	–E1
P2 connector — communication **D** = IDC **L** = wire crimp	K	M	D	O	1	F	S	**D**	2	3	A	7	–E1
Motor size **23** = NEMA 23 (2.3" / 57 mm)	K	M	D	O	1	F	S	D	**2**	**3**	A	7	–E1
Motor length **A** = single stack **B** = double stack **C** = triple stack **D** = quad stack	K	M	D	O	1	F	S	D	2	3	**A**	7	–E1
Drive voltage *(1)* **7** = +12 to +75 VDC **6** = +12 to +60 VDC	K	M	D	O	1	F	S	D	2	3	A	**7**	–E1
Options Leave blank if not wanted Options may not be combined													**–E1**

–E___ = external optical encoder with index mark

line count	100	200	250	256	400	500	512	1000	1024
single-end part #	E1	E2	E3	EP	E4	E5	EQ	E6	ER
differential part #	EAL	EBL	ECL	EWL	EDL	EHL	EXL	EJL	EYL

–N = rear control knob for manual positioning

(1) Only quad stack motors have +12 to +60 VDC drives, all other motors have +12 to +75 VDC drives.

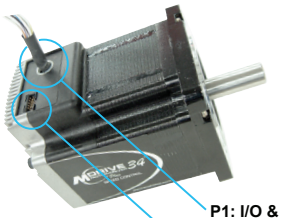
Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® 34 Plus

Speed Control

with programmable velocity control

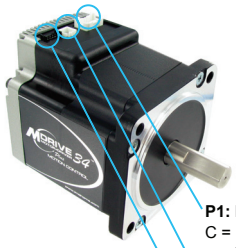
MDrive® 34 Plus²
flying leads interface



P1: I/O & Power
F = 12" flying leads

P2: Communication
D = SPI with 10-pin IDC non-locking connector

MDrive® 34 Plus²
pluggable interface



P1: I/O and optional encoder
C = 12-pin locking wire crimp connector (20-pin with internal encoder option)

P3: Power
2-pin locking wire crimp connector

P2: Communication
L = 10-pin friction lock wire crimp connector

Part numbers

Example:	K	M	D	O	3	F	S	D	3	4	A	7	–E1
QuickStart Kit **K** = kit option, or leave blank if not wanted	**K**	M	D	O	3	F	S	D	3	4	A	7	–E1
MDrive Plus version **MDO** = Speed Control	K	**M**	**D**	**O**	3	F	S	D	3	4	A	7	–E1
Input **3** = Plus², expanded features	K	M	D	O	**3**	F	S	D	3	4	A	7	–E1
P1 connector **F** = flying leads **C** = pluggable	K	M	D	O	3	**F**	S	D	3	4	A	7	–E1
Communication **S** = SPI	K	M	D	O	3	F	**S**	D	3	4	A	7	–E1
P2 connector **D** = only with P1 connector F **L** = only with P1 connector C	K	M	D	O	3	F	S	**D**	3	4	A	7	–E1
Motor size **34** = NEMA 34 (3.4" / 86 mm)	K	M	D	O	3	F	S	D	**3**	**4**	A	7	–E1
Motor length **A** = single stack **B** = double stack **C** = triple stack	K	M	D	O	3	F	S	D	3	4	**A**	7	–E1
Drive voltage **7** = +12 to +75 VDC	K	M	D	O	3	F	S	D	3	4	A	**7**	–E1
Options Leave blank if not wanted Options may be combined													**–E1**

–E___ = internal optical encoder with index mark *(1)*

line count	100	200	250	256	400	500	512	1000	1024
single-end part #	E1	E2	E3	EP	E4	E5	EQ	E6	ER
differential part #	EA	EB	EC	EW	ED	EH	EX	EJ	EY

–N = rear control knob for manual positioning

(1) Products with pluggable interface available only with differential encoder.

Easy MDrive part numbers via an interactive tool at:
www.motion.schneider-electric.com/MDrivePlus.html

MDrive® Plus
System performance

MDrive® Plus
Motor specifications

Motor specifications MDrive 14					
		Holding torque	Detent torque	Rotor inertia	Weight (motor + driver)
Motor stack length	Single	18.0 oz-in / 12.71 N-cm	2.0 oz-in / 1.4 N-cm	0.000198 oz-in-sec^2 / 0.014 kg-cm^2	5.29 oz / 150.0 g
	Triple	36.0 oz-in / 25.00 N-cm	4.4 oz-in / 3.1 N-cm	0.000801 oz-in-sec^2 / 0.0566 kg-cm^2	12.8 oz / 380.0 g

Motor specifications MDrive 17					
		Holding torque	Detent torque	Rotor inertia	Weight (motor + driver)
Motor stack length	Single	32.0 oz-in / 22.6 N-cm	1.66 oz-in / 1.17 N-cm	0.00053 oz-in-sec^2 / 0.038 kg-cm^2	10.4 oz / 294.8 g
	Double	60.0 oz-in / 42.4 N-cm	2.08 oz-in / 1.47 N-cm	0.00080 oz-in-sec^2 / 0.057 kg-cm^2	12.0 oz / 340.2 g
	Triple	74.9 oz-in / 52.9 N-cm	3.47 oz-in / 2.45 N-cm	0.00116 oz-in-sec^2 / 0.082 kg-cm^2	15.2 oz / 430.9 g

Motor specifications MDrive 23					
		Holding torque	Detent torque	Rotor inertia	Weight (motor + driver)
Motor stack length	Single	90.0 oz-in / 64.0 N-cm	3.9 oz-in / 2.7 N-cm	0.0025 oz-in-sec^2 / 0.18 kg-cm^2	21.6 oz / 612.3 g
	Double	144.0 oz-in / 102.0 N-cm	5.6 oz-in / 3.92 N-cm	0.0037 oz-in-sec^2 / 0.26 kg-cm^2	26.4 oz / 748.4 g
	Triple	239.0 oz-in / 169.0 N-cm	9.7 oz-in / 6.86 N-cm	0.0065 oz-in-sec^2 / 0.46 kg-cm^2	39.2 oz / 1111.3 g
	Quad	283.0 oz-in / 200.0 N-cm	14.2 oz-in / 10.0 N-cm	0.0108 oz-in-sec^2 / 0.76 kg-cm^2	61.6 oz / 1746.3 g

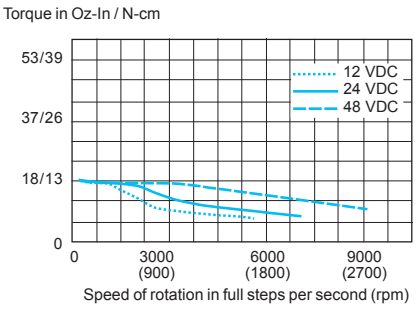
Motor specifications MDrive 34					
		Holding torque	Detent torque	Rotor inertia	Weight (motor + driver)
Motor stack length	Single	408.0 oz-in / 288.0 N-cm	10.9 oz-in / 7.7 N-cm	0.01275 oz-in-sec^2 / 0.90 kg-cm^2	4.1 lb / 1.9 kg
	Double	574.0 oz-in / 405.0 N-cm	14.16 oz-in / 10.0 N-cm	0.01924 oz-in-sec^2 / 1.35 kg-cm^2	5.5 lb / 2.5 kg
	Triple	1090.0 oz-in / 770.0 N-cm	19.83 oz-in / 14.0 N-cm	0.03849 oz-in-sec^2 / 2.70 kg-cm^2	8.8 lb / 4.0 kg

Motor specifications MDrive 34 ac					
		Holding torque	Detent torque	Rotor inertia	Weight (motor + driver)
Motor stack length	Single	330.0 oz-in / 233.0 N-cm	10.9 oz-in / 7.7 N-cm	0.01416 oz-in-sec^2 / 1.0 kg-cm^2	6.4 lb / 2.9 kg
	Double	500.0 oz-in / 353.0 N-cm	14.16 oz-in / 10.0 N-cm	0.02266 oz-in-sec^2 / 1.6 kg-cm^2	7.7 lb / 3.5 kg
	Triple	750.0 oz-in / 529.0 N-cm	19.83 oz-in / 14.0 N-cm	0.04815 oz-in-sec^2 / 3.4 kg-cm^2	11.0 lb / 5.0 kg

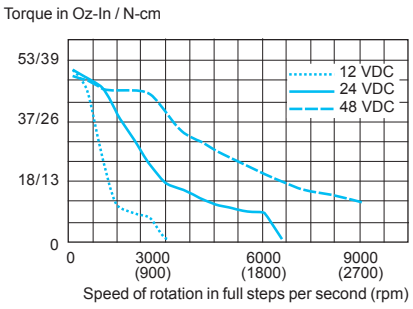
MDrive® Plus
Speed torque characteristics

Speed torque characteristics MDrive 14

Single stack length

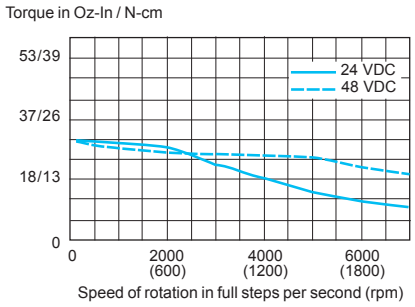


Triple stack length

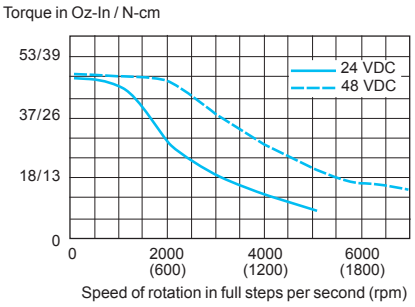


Speed torque characteristics MDrive 17

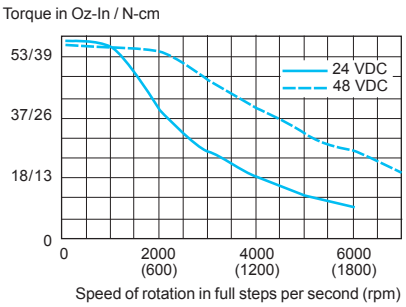
Single stack length



Double stack length

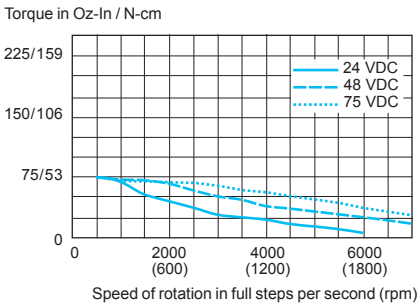


Triple stack length

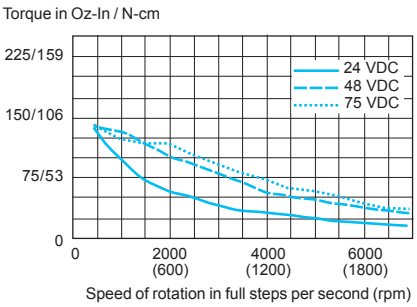


Speed torque characteristics MDrive 23

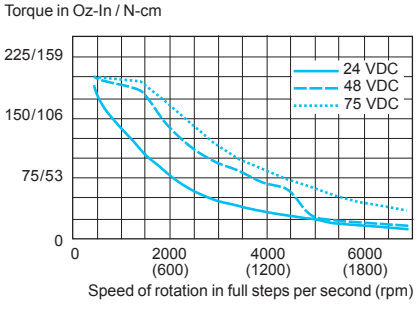
Single stack length



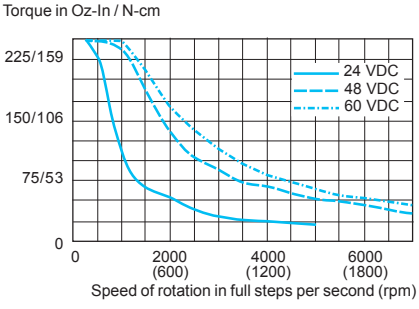
Double stack length



Triple stack length



Quad stack length



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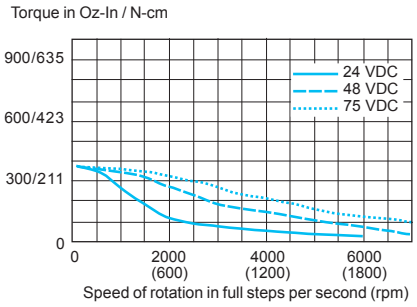
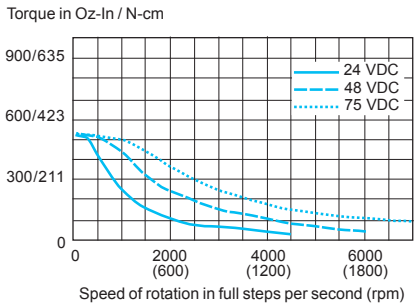
Speed torque characteristics

Speed torque characteristics MDrive 34

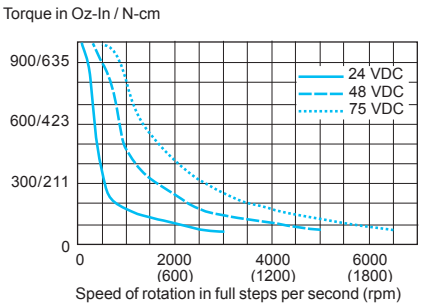
Single stack length



Double stack length

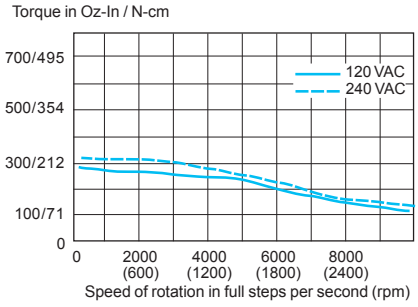


Triple stack length

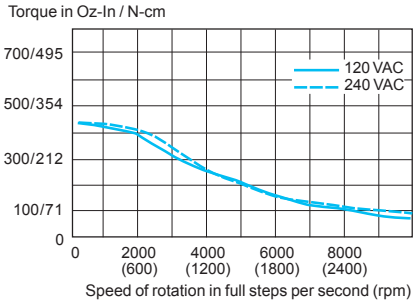


Speed torque characteristics MDrive 34 ac

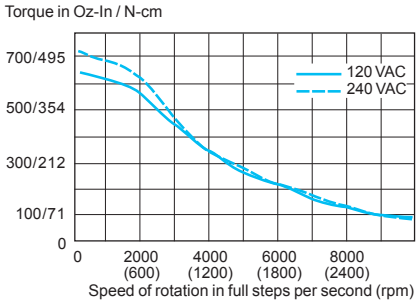
Single stack length



Double stack length



Triple stack length



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